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TRAVEL IN THE BART SERVICE AREA

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The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. Finally, the findings will be interpreted with regard to their implications for the planning of transportation and urban development in the Bay Area and other metropolitan areas.

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BART IMPACT PROGRAM

TRAVEL IN THE BART SERVICE AREA

OCTOBER 1977
(REVISED)

WORKING PAPER

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AND

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WASHINGTON, D.C.

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BART Impact Program
Transportation System and Travel Behavior Project

Travel in the BART Service Area
Prepared by
Peat, Marwick, Mitchell & Co.

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16. Abstract

BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. The report analyzes the results of two travel surveys: (1) the May 1976 BART Passenger Profile Survey, an on-route self-completion questionnaire survey of 8,000 BART riders, and (2) the BART Impact Program May 1975 Areawide Travel Survey, a telephone interview survey of 1,000 individuals in the BART service area. The report presents information on the socioeconomic characteristics of BART, bus, and automobile travelers, the purposes and other characteristics of their trips, and the shares of areawide travel carried by the modes.

BART's ridership is heavily oriented towards peak-period journeys to and from workplaces in central San Francisco and Oakland. Two-thirds of all BART trips are between home and work. The 588,000 BART trips made Monday through Friday for all purposes in May 1975 represent a 2.4% share of all areawide trips. But BART's share of areawide trips between home and work is much higher; the 381,000 weekly BART work trips represent a 5.2% share of all weekly work trips. BART's trip market share is highest for very long trips. Of all work trips taking more than 55 minutes, BART carries 38.3%.

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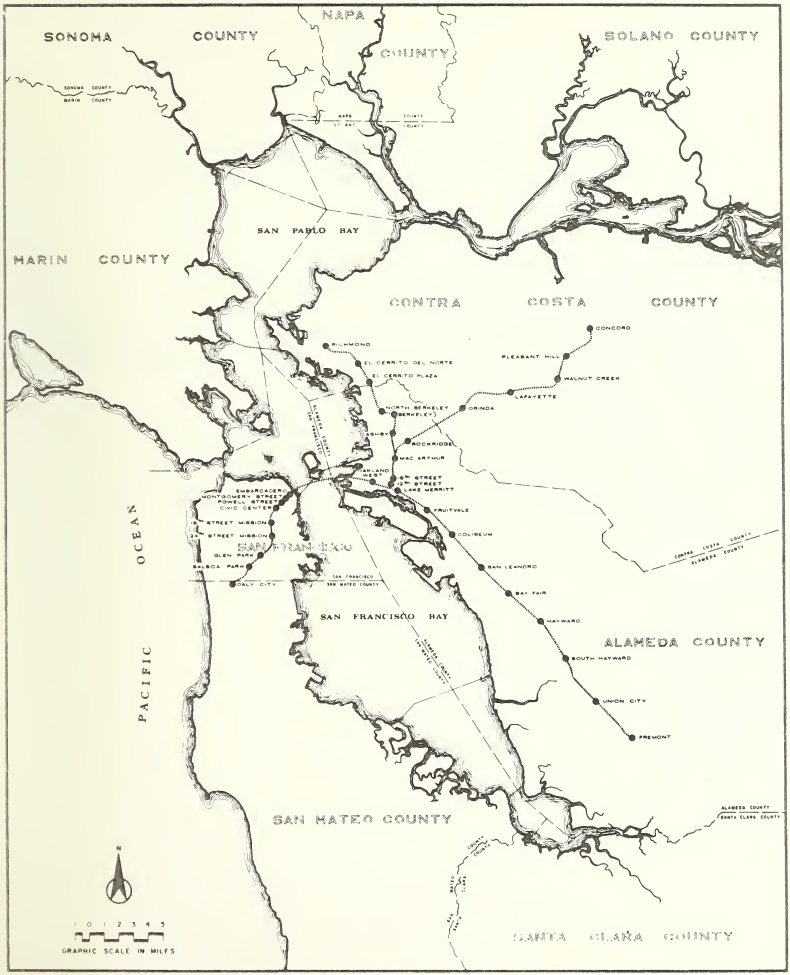

BAY AREA RAPID TRANSIT SYSTEM

PEAT, MARWICK, MITCHELL & CO.
SAN FRANCISCO

PREFACE

This report describes analyses undertaken as part of the Phase II Transportation System and Travel Behavior (TSTB) Project of the BART Impact Program by staff of Peat, Marwick, Mitchell & Co. Results of two travel surveys are analyzed:

1. BART Passenger Profile Survey, May 1976

2. BART Impact Program Areawide Travel Survey, May 1975

The report updates and extends preliminary analyses reported in the Phase I TSTB Project Final Report Transportation and Travel Impacts of BART: Interim Service Findings, BART Impact Program Document No. FR 6-3-75, April 1976.

Two appendixes have been added to this October 1977 report revision. The first, "Determination of BART's Service Area," defines the area most directly served by BART based on BART riders' trip origins. This excludes areas within BART's taxing district which are beyond easy access to the stations. The second appendix, "Demography of Areas Served by BART," provides a variety of basic data from which comparisons among population groups may be made.

SUMMARY

Scope of Report

BART, the 71-mile, 34-station San Francisco Bay Area Rapid Transit System, was opened in stages from September 1972 to September 1974, the last stage being the underwater transbay tube linking the downtowns of San Francisco and Oakland. Presently, BART serves about 135,000 one-way trips each weekday from 6:00 a.m. to midnight. This report (1) provides information about the socioeconomic characteristics of BART riders and about the kinds of trips being made by them; (2) describes the socioeconomic characteristics of all travelers in the BART service area, and the number, modes, and characteristics of trips made by them; and (3) establishes the shares of areawide trips being made by BART, bus, and automobile. The report analyzes the results of two surveys of travel in the BART service area.

Surveys Analyzed

The May 1976 BART Passenger Profile Survey determined the characteristics of BART riders, and the purposes and other characteristics of their trips. It was based on a self-completion questionnaire handed out on BART station platforms to a representative sample of travelers over high school age. Over 8,000 questionnaires were returned and analyzed using weighting factors to account for differences in sampling and response rates by station and time of day. The data were also weighted to account for differential response rates by ethnic/racial category.

The May 1975 BART Impact Program Areawide Travel Survey was a telephone interview survey designed to provide data on respondents' perceptions and knowledge of BART, and their travel habits. The questionnaire included a series of questions designed to obtain a detailed "diary" of all trips made by the respondent on the day before the telephone interview. The survey sample was selected by random-digit dialing of telephones in a BART service area defined as the three BART District counties of San Francisco, Alameda, and Contra Costa, and the northern portion of San Mateo County. One thousand interviews with a representative sample of individuals aged 16 and over were completed. The survey data were analyzed using weighting factors to account for sampling and nonresponse biases.

Socioeconomic Characteristics of BART Travelers

Comparison of the socioeconomic characteristics of BART riders with corresponding census characteristics for the population of the BART service area as a whole suggests that BART travelers contain a slightly higher percentage of males, and are younger. Overall, the census and BART rider distributions of family income are similar. BART ridership has about the same percentage of blacks as are present in the total adult population but a smaller percentage of Spanish-Americans. For travel within the West Bay, 26% of BART's ridership is nonwhite, compared with 16% for East Bay BART travel and 13% for transbay BART travel.

Characteristics of BART Trips

BART's ridership is heavily oriented towards peak-period journeys to and from workplaces in the central business districts of San Francisco and Oakland. About 68% of BART trips are made in the morning and evening peak periods; 67% of all-day BART trips are between home and work. Trips to or from school or college make up a further 11%. The average BART trip takes 46 minutes door-to-door, of which 33 minutes are spent on BART. Transbay trips average 54 minutes door-to-door, East Bay trips 46 minutes, and West Bay trips 34 minutes.

The 1976 Passenger Profile Survey estimates that, of trips made before BART was in operation, 43% were previously made by bus or streetcar and 57% by automobile or other modes. About 26% of East Bay trips previously used bus, 43% of transbay trips previously used bus, and 64% of West Bay trips used bus or streetcar before BART. Of trips not made before BART, 9% were not made because the traveler previously lacked a means of transportation. This percentage may be taken as an estimate of induced trips on the System.

BART's Share of Trips

An estimated total of 24.7 million person-trips are made for all purposes in vehicles Monday through Friday throughout the BART service area. Of these, 588,000 are made on BART, representing a 2.4% share. Bus (or streetcar) trips account for another 10.6%, and the remaining 87.0% are by automobile (or truck). If total weekday trips in the BART service area are stratified by trip purpose, BART's largest share is for trips to and from work (5.2% of all work trips compared with 17.7% by bus and 77.1% by automobile). BART's second largest share is 2.9% of school and college trips, followed by 1.9% of business trips. BART carries negligible shares of shopping and other-purpose trips.

As trip travel times increase, so does BART's share of total areawide travel. For trips under 16 minutes, BART carries a negligible 0.2%; for trips between 16 and 55 minutes BART's share is 3.8%; and for very long trips (more than 55 minutes) BART's share is 14.8%. Considering only journey-to-work trips, BART's share of very long trips is even more pronounced; of all work trips taking more than 55 minutes, BART carries 38.3%.

Potential BART Trips

The above BART "trip market" shares are based on the total number of trips made throughout the May 1975 Areawide Travel Survey sampling area. However, this area includes many parts to which BART effectively provides very little service. To define potential BART trips, i.e., trips which the System could reasonably serve, respondents to the areawide survey were asked whether or not they could have used BART for trips reported. If the respondent answered "yes," the trip was counted as a potential BART trip. Survey results suggest that 11.2% of all weekday trips are or can be made on BART. This represents a potential market of 2.8 million trips per week in total. BART carries 21.3% of this total potential travel market. This estimate compares with the 2.4% estimate for BART's share of all areawide trips.

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SAN FRANCISCO BAY REGION

CENTRAL AREA

Metropolitan Transportation Commission

BART: The Bay Area Rapid Transit System

Length: The 71-mile system includes 20 miles of subway, 24 miles on elevated structures and 27 miles at ground level. The subway sections are in San Francisco, Berkeley, downtown Oakland, the Berkeley Hills Tunnel and the Transbay Tube.

Stations: The 34 stations include 13 elevated, 14 subway and 7 at ground level. They are spaced at an average distance of 2.1 miles: stations in the downtowns are less than one-half mile apart, while those in suburban areas are two to four miles apart. Parking lots at 23 stations have a total of 20,200 spaces. There is a fee (25 cents) at only one of the parking lots. BART and local agencies provide bus service to all stations.

Trains: Trains are from 3 to 10 cars long. Each car is 70 feet long and has 72 seats. Top speed in normal operations is 70 mph with an average speed of 38 mph including station stops. All trains stop at all stations on the route.

Automation: Trains are automatically controlled by the central computer at BART headquarters. A train operator on board each train can override automatic controls in an emergency.

Magnetically encoded tickets with values up to $20 are issued by vending machines. Automated fare gates at each station compute the appropriate fare and deduct it from the ticket value.

Fares: Fares range from 25 cents to $1.45, depending upon trip length. Discount fares are available to the physically handicapped, children 12 and under, and persons 65 and over.

Service: BART serves the counties of Alameda, Contra Costa and San Francisco, which have a combined population of 2.4 million. The system was opened in five stages, from September 1972 to September 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.

Routes are identified by the terminal stations: Daly City in the West Bay, Richmond, Concord and Fremont in the East Bay. Trains operate from 6:00 a.m. to midnight on weekdays, every 12 minutes during the daytime on three routes: Concord-Daly City, Fremont-Daly City, Richmond-Fremont. This results in 6-minute train frequencies in San Francisco, downtown Oakland and the Fremont line where routes converge. In the evening, trains are dispatched every 20 minutes on only the Richmond-Fremont and Concord-Daly City routes. Service is provided on Saturdays from 9 a.m. to midnight at 15-minute intervals. Future service will include a Richmond-Daly City route and Sunday service.* Trains will operate every six minutes on all routes during the peak periods of travel.

Patronage: Approximately 146,000 one-way trips are made each day. Approximately 200,000 daily one-way trips are anticipated under full service conditions.

Cost: BART construction and equipment cost $1.6 billion, financed primarily from local funds: $942 million from bonds being repaid by the property and sales taxes in three counties, $176 million from toll revenues of transbay bridges, $315 million from federal grants and $186 million from interest earnings and other sources.

March 1978

*Sunday service began in July, 1978

I. INTRODUCTION

Objectives

The objectives of the report are to:

- Provide a comprehensive picture of BART ridership in terms of the socioeconomic characteristics of BART riders and the kinds of trips being made by them

- Describe the socioeconomic characteristics of all travelers in the BART service area, and the number, modes, and characteristics of trips made by them

- Establish the shares of total areawide trips being made by BART, bus, automobile, and other modes

- Summarize the attitudes of the areawide population towards BART, and document how these attitudes have changed

Report Outline

Chapter II outlines the surveys and other sources of data analyzed in the report.

Chapter III describes the area served by the BART System, the characteristics of the System, and the service provided by the rest of the transportation system.

Chapter IV describes the socioeconomic characteristics of travelers using the BART System.

Chapter V describes the characteristics of trips made on BART.

Chapter VI compares the socioeconomic characteristics of areawide travelers using BART, bus, and automobile modes.

Chapter VII gives various stratifications of trip types within the areawide total and the distributions of these trips among BART, bus, automobile, and other modes.

Chapter VIII analyzes BART's share of weekday work trips, again for various stratifications of the data.

Chapter IX assesses BART's share of its potential trip market as determined by respondents' perceptions of whether they could use BART for trips.

Chapter X summarizes travelers' perceptions of and satisfaction with BART according to trip purpose and mode used and presents the reasons why some travelers have reduced their use of BART.

II. DESCRIPTION OF SURVEYS ANALYZED

The two principal surveys analyzed in this report are:

1. BART Passenger Profile Survey, May 1976

2. BART Impact Program Areawide Travel Survey, May 1975

BART Passenger Profile Survey, 1976

The 1976 BART Passenger Profile Survey (PPS) is the fourth in a series of annual on-route surveys of BART riders conducted for the Bay Area Rapid Transit District (BARTD) and the Metropolitan Transportation Commission (MTC) to determine the characteristics of BART riders, trip purposes, and other characteristics of trips being made on the System.*

Survey Method. The survey was conducted during two periods: daytime and evening. The daytime survey started at 6:00 a.m. and finished at 3:00 p.m., capturing morning peak ridership and most of the daytime off-peak ridership. The evening survey was conducted from 7:00 p.m. to midnight, capturing evening off-peak ridership. The analyses in this report deal only with the daytime survey. This is because BART's ridership in the evening is relatively small, so that only a limited PPS sample is available, and because the evening survey was not as effectively controlled.

Self-completion survey questionnaires were handed out on BART station platforms. To provide a random sample of BART riders, questionnaires were distributed to every N^{th} person who met certain eligibility criteria (over high school age, not a BART employee). A tally-sheet record of the questionnaire number, destination station, approximate age, sex, and race was made for every person at the time they were given the questionnaire.

The sampling rate (questionnaires distributed divided by eligible passengers) averaged 16% for the daytime survey or 334 questionnaires handed out per station. (All 33 stations were sampled. The Embarcadero Station was not open at the time of the survey.) The response rate (questionnaires returned divided by questionnaires distributed) averaged 74%. In total 8,142 questionnaires were returned, 247 per station on average.

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*An MTC report is available that fully describes how the survey was planned and conducted, and how the data were processed: "1976 BART Passenger Profile Survey: Field Methods and Processing Procedures," Data Document, Metropolitan Transportation Commission, September 1976.

Weighting Factors. Questionnaire distribution procedures were designed and implemented to provide a random sample of all travelers using BART. However, the returned questionnaires available for analysis may not be a random sample of all travelers because of errors arising from a combination of sampling and nonresponse biases. Using information from BART faregate counts and the tally-sheet records of questionnaire handouts, weighting factors were developed which attempt to compensate for biases arising from:

1. Differences in sampling rates by station and time of day

2. Differences in response rates by station and time of day

3. Differences in response rates by ethnic category and time of day

Weighting factors intended to compensate for biases arising from 1 and 2 are documented in the 1976 Passenger Profile Survey data document referenced earlier.

Biases arising from 3 above may be compensated for by the set of weighting factors described in Appendix A. The effect of this weighting scheme is to increase the representation of ethnic groups with relatively low response rates and decrease the representation of ethnic groups with relatively high response rates. The weighting scheme assumes that travelers of a given ethnic group who did not respond have the same distribution of characteristics as travelers of the same ethnic group who did respond.

All analyses of the 1976 Passenger Profile Survey given in this report are of data weighted to compensate for differences in sampling rates by station and time of day (1), and differences in response rates by ethnic category and time of day (3). Differences in response rates among stations (2) are not accounted for explicitly.

Since BART riders were sampled only during the morning and midday off-peak periods, relatively few people making return BART trips were included in the survey. Moreover, BART riders who said they had already received a questionnaire earlier in the day were not asked to fill in another. Thus, the survey effectively sampled travelers (rather than trips made on the System). But faregate counts (i.e., counts of trips made on the System) were used to factor up the number of survey responses to a representation of total BART trips during the survey period. Strictly, this use of trip counts to factor up the responses of sampled travelers introduces an inconsistency and possible source of bias into the analysis--for example, BART trips made as second or subsequent trips by travelers on the survey day will tend to be underrepresented in the trip total. However, this bias is probably negligible, and the results

for the daytime PPS given in this report (shown in the tables as representing a total of 66,800 trips) can probably be considered a reasonable description of both the population of BART travelers surveyed (aged 16 years and older) and the characteristics of the trips made by them over the 6:00 a.m. to 3:00 p.m. survey period.

The intent of the survey was to sample the first half of daily BART ridership, on the implicit assumption that there is a symmetry in the pattern of use of the System. Indeed, over 90% of the survey responses were from travelers making half of a round trip on BART, so the assumption of symmetry appears valid. However, slightly more than half of BART's ridership was sampled (66,800 trips compared to 124,500 total, or 54%). Consequently, the survey data slightly overrepresent off-peak travel and underrepresent peak-period travel.

In order to account for this distortion, weighting factors were computed to allow the characteristics of BART's all-day (6:00 a.m. to midnight) ridership (124,500 trips) to be estimated from the results of the daytime (6:00 a.m. to 3:00 p.m.) survey (representing 66,800 trips). Derivation of the weighting factors is detailed in Appendix B. In applying these factors to the survey data it is assumed that BART trips made during the afternoon peak (3:00 p.m. to 7:00 p.m.) and the travelers making them have characteristics which are the same as, or the mirror image of, the characteristics of trips made during the morning (6:00 a.m. to 9:00 a.m.) peak; also, it is assumed that trips made during the evening (7:00 p.m. to midnight) have characteristics which are the same as those made off-peak (9:00 a.m. to 3:00 p.m.).

Applying the peak and off-peak weighting factors gives a closer representation of the characteristics of BART's total ridership than is given by the 6:00 a.m. to 3:00 p.m. survey data alone. However, as shown in Chapters IV and V, the differences between the estimated distributions for the 6:00 a.m. to 3:00 p.m. survey period and the 6:00 a.m. to midnight period are small for many variables. This is particularly true for the socioeconomic characteristics of BART travelers.

Thus, the survey sample (representing 66,800 trips between 6:00 a.m. and 3:00 p.m.) probably gives a good representation of BART's total ridership for most variables and is used in constructing most of the tables in Chapters IV and V. Where an appreciable bias is introduced by the overrepresentation of off-peak travel (principally in the descriptions of trip characteristics), the peak and off-peak weighting factors are used in constructing the tables to give a better representation of BART's total all-day ridership (124,500 trips between 6:00 a.m. and midnight).

BART Impact Program Areawide Travel Survey, 1975

The survey analyzed in the report to estimate the characteristics of areawide travel is a telephone interview survey conducted in May 1975.* The sample was selected by random-digit dialing of telephones in a BART service area defined as the three BART District counties of San Francisco, Alameda, and Contra Costa, and the northern portion of San Mateo County.**

The survey sought information on respondents' perceptions and knowledge of BART and their travel habits including the modes they use for various trip purposes and places they frequently visit. The questionnaire includes a series of questions designed to obtain a detailed "diary" of all trips made by the respondent on the day before the telephone interview, covering the time at which each trip began, the time the trip took, the number of people traveling with the respondent, the mode used, the trip purpose, and whether or not the trip was home-based. BART riders were asked the BART stations they used, how they got to and from the stations, and how, if at all, they would have made the trip if BART were unavailable. Respondents who did not use BART were asked whether they could have taken BART, and if so the stations and access modes they would have used.

The survey was originally designed to provide:

- Data on travel attitudes and behavior in the BART service area as a context for assessing BART's ridership and share of travel.
- Data which can be directly compared with data from the similar 1971 and 1973 "Attitude and Awareness" surveys (discussed in the following section) in a "time-series" analysis of changes in traveler behavior and perception of and satisfaction with BART.

Satisfying the requirements of the first data set necessitates using a random sample of all individuals (i.e., travelers or potential travelers) in the BART service area. But the second data set requires a household sample, since the 1971 and 1973 surveys sample households in the three-county area (interviewing the first adult who answered the telephone). To meet both objectives, the 1975 survey drew two samples: (1) individuals (aged 16 and over) randomly drawn from the households contacted

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*The survey, conducted by the BART Impact Program TSTB Project, is fully described and evaluated in a separate BART Impact Program report: "May 1975 Areawide Travel Survey: Documentation and Evaluation of Procedures," Data Document prepared by Peat, Marwick, Mitchell & Co. for the Metropolitan Transportation Commission, October 1976.

**The San Mateo County portion of the service area is made up of the cities of South San Francisco, San Bruno, Brisbane, Colma, Daly City, Pacifica, and Millbrae.

and (2) people (aged between 18 and 65) who first answered the telephone. These two samples are referred to as the "traveler" and "household" samples, respectively.

Actually, all respondents (i.e., people interviewed) were selected in a way which qualified them for inclusion in the traveler sample. If an individual who qualified for the traveler sample also happened to be the person who answered the telephone and was aged between 18 and 65, then he or she also qualified for the household sample. Thus, the household sample was a subset of the traveler sample; of the total traveler sample of 1,002 respondents eventually included in the survey, 682 were also included in the household sample (a 68% overlap).

The two samples were compared according to age, annual family income, race, sex, education level, travel behavior characteristics, purpose of trip, and mode used for trip.* The two samples are very similar in socioeconomic characteristics except for a higher proportion of females in the household sample than in the traveler sample. The travel behavior characteristics of the two samples are also similar. (Statistically, it is not possible to reject the hypothesis that the two samples were drawn randomly from the same population at a 95% confidence level, except for the distribution of males and females.) For all socioeconomic characteristics (whether the two sample distributions differ significantly or not), the traveler sample distribution more nearly conforms to the distribution given by the 1970 U.S. Census for the survey area population. So the traveler sample appears to be the more representative sample for analyzing areawide travel behavior. Therefore, this report analyzes only the traveler sample.

Also, all analyses are for a sample in which each respondent is weighted according to his or her county of residence, sex, race, age, and family income. The weighting factors were computed so that the resulting aggregate distributions of these characteristics for the weighted traveler sample conform to the 1970 census distributions within each county.** A total (unweighted) sample of 1,002 individuals is analyzed.

The principal shortcoming of the survey is that, in common with similar home-based telephone surveys, there are proportionately fewer workers in the sample than in the total population. This occurs partly as a result of the sampling procedures used to contact respondents (some initial contacts were permitted during daytime hours, when employed

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*See "May 1975 Areawide Travel Survey: Documentation and Evaluation of Procedures," pp. 13-15, for details of the traveler and household sample comparisons.

**See "May 1975 Areawide Travel Survey: Documentation and Evaluation of Procedures," pp. 16-18, for comparisons of the (unweighted) traveler sample and census distributions of age, sex, race, and income.

persons are less likely to be at home), partly as a result of the way in which the survey defined workers (as those who made a work trip on the day before the interview), and partly because employed persons are in general less inclined to submit to an interview when they are at home.* Based on analysis of U.S. Census data, trips to and from work on weekdays are estimated to be underrepresented in the survey by about 20% relative to the number of trips made for other purposes. To account for this source of distortion in the survey results, the total number of work trips analyzed in Chapters VI and VII has been adjusted upwards accordingly.

Attitude and Awareness Surveys, 1971 and 1973

Chapter X compares results of the May 1975 areawide survey to two earlier areawide telephone surveys conducted for the BART District in October 1971 and May 1973. These are known respectively as the Phase I and Phase II Attitude and Awareness Surveys.** Both surveys sampled 900 residences, 300 from each of the three BART District counties. (Neither surveyed any part of San Mateo County.) Like the 1975 areawide survey, the 1971 survey used random-digit dialing to sample households. In the 1973 survey, respondents' telephone numbers were sampled from telephone directory listings.

The surveys represent only individuals aged 18 to 65, and surveyed males and females in equal proportions. Responses to both surveys were weighted in the same way to reflect the actual population distribution among the three counties, with each response being weighted in accordance with the number of people in the household 18 to 65 years old.

The 1971 Attitude and Awareness Survey was conducted before BART began service. The 1973 survey was conducted when service was operating only on the Fremont and Richmond Lines.

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*See "May 1975 Areawide Travel Survey: Documentation and Evaluation of Procedures," pp. 19-25, for details.

**The methodology and findings of the two surveys are described in "Attitude and Awareness Study: A Comparative Analysis of Phase I and Phase II," prepared by the BARTD Office of Research, October 1973. All results of the two surveys given here are quoted directly from BARTD's report.

BART Passenger Profile Survey, 1975

In May 1975, at approximately the same time as the 1975 areawide telephone survey, BARTD conducted an on-board survey of BART ridership.* This survey was similar in intent and method to the 1976 PPS described earlier. The principal differences between the two were that (1) the 1975 survey was conducted for the entire day of BART operations (rather than just from 6:00 a.m. to 3:00 p.m. as was the case in 1976), and (2) much more careful controls on sampling and nonresponse rates were used in the 1976 survey than in 1975. As in the 1976 PPS, self-completion questionnaires were distributed to BART riders as they entered stations. Approximately 10,000 returned questionnaires were analyzed. Survey responses to the 1975 PPS were weighted to compensate for biases arising from differential response rates by time of day but not by station or ethnic group.

As the May 1975 areawide survey contains information on only a small sample of BART trips, estimates of the characteristics of BART trips and travelers given in the report are derived from the 1975 or 1976 BART Passenger Profile Surveys. As noted on the individual tables, the 1975 BART survey is used to establish the distribution of basic traveler socioeconomic characteristics (in Table 19) and trip purposes (in Table 20). However, the 1976 BART survey is used to estimate the distribution of BART trip characteristics in other tables of the report. This is because the 1976 survey, by reason of its superior field control and associated weighting scheme, is considered to provide more reliable information on the detailed characteristics of BART trips.

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*Survey methodology and findings are reported in "Passenger Profile Study III 1975," prepared by BARTD Department of Planning, Budgeting and Research. All results of the 1975 survey given here are quoted directly from BARTD's report.

III. BART AND THE BART SERVICE AREA

The BART Service Area

As defined by the sampling plan for the May 1975 Areawide Travel Survey, the BART service area comprises the three counties of San Francisco, Alameda, and Contra Costa and the northern part of San Mateo County. Table 1 shows the population, urbanized area, and employment for this area. Table 2 shows socioeconomic characteristics of the service area population as given by the 1970 census. Table 3 gives the census distributions of sex, age, and race for the population aged 16 years or older (i.e., the age group surveyed in both the 1975 areawide and 1976 BART surveys). The income distributions shown in Table 2 were estimated by taking the 1969 distributions given by the census and adjusting them to reflect the change in the average income distribution between 1969 and 1975 for the U.S. as a whole. Details are given in Appendix C.

Contra Costa County. Contra Costa County is a predominantly low-density residential area containing 41% of the urbanized land area, 23% of the population, and 14% of the employment in the BART service area. The County as a whole is the richest (only 19% of the residents had less than a $10,000 annual family income in 1975), and has the lowest nonwhite population (19%) of the areas shown. Moreover, nearly all the minority and low-income residents live in Richmond and other parts of western Contra Costa County; the more recently developed areas of Walnut Creek and Concord to the east of the Berkeley Hills are predominantly affluent low-density suburbs.

Northern San Mateo County. The part of San Mateo County included in the survey area contains a mix of predominantly white residential areas and industrial areas. The area contains 9% of the survey area resident population (of whom 24% are nonwhite) and 7% of the survey area employment.

City and County of San Francisco. San Francisco is the major employment center with 42% of the jobs (many of these in the downtown business and financial districts), and contains 26% of the population of the BART service area. San Francisco is the most densely populated, although its population has been declining since 1950. The City contains a higher proportion of nonwhites (43%) than the other areas and higher proportion of low-income families (30% had less than a $10,000 annual income in 1975).

Table 1

TRENDS IN THE BART SERVICE AREA

	1970		1975		Percentage Change		
	Number	Percent of Total Service Area	Number	Percent of Total Service Area	1970-1975	1960-1970	1950-1960
Alameda County							
Total Population	1,073,200	41.6%	1,089,900	42.1%	+ 1.6%	+18.2%	+22.7%
Employed Residents	452,000	40.7	458,400	40.5	+ 1.4		
Registered Automobiles	511,700	42.3	548,700	42.2	+ 7.2	+36.3	
Employment	469,700	38.6	434,300	36.5	- 7.5		
Contra Costa County							
Total Population	558,400	21.6%	582,800	22.5%	+ 4.4%	+36.5%	+36.8%
Employed Residents	223,900	20.2	230,800	20.4	+ 3.1		
Registered Automobiles	281,900	23.3	322,500	24.8	+14.4	+65.4	
Employment	142,800	11.7	160,100	13.5	+12.1		
San Francisco County							
Total Population	715,700	27.7%	672,700	26.0%	- 6.0%	- 3.3%	- 4.5%
Employed Residents	323,600	29.2	327,300	28.9	+ 1.1		
Registered Automobiles	288,100	23.8	278,300	21.4	- 3.4	+ 8.8	
Employment	504,500	41.5	495,400	41.6	- 1.8		
Northern San Mateo County[a]							
Total Population	232,300	9.1%	246,000	9.4%	+ 5.9%	+30.7%	+88.6%
Employed Residents	109,800	9.9	115,300	10.2	+ 5.0		
Registered Automobiles	129,000	10.6	150,300	11.6	+16.5	+39.0	
Employment	99,500	8.2	99,900	8.4	+ 0.4		
Total BART Service Area							
Total Population	2,579,600	100.0%	2,591,400	100.0%	+ 0.5%	+15.4%	+17.1%
Employed Residents	1,109,300	100.0	1,131,800	100.0	+ 2.0		
Registered Automobiles	1,210,700	100.0	1,299,800	100.0	+ 7.4	+34.0	
Employment	1,216,500	100.0	1,189,700	100.0	- 2.2		

a. Cities of Daly City, Colma, Brisbane, South San Francisco, Pacifica, San Bruno, Millbrae, and Burlingame.

Table 2

SOCIOECONOMIC CHARACTERISTICS OF THE BART SERVICE AREA POPULATION

Socioeconomic Characteristic	County of Residence: Alameda	Contra Costa	San Francisco	Northern San Mateo[a]	Total BART Service Area
Sex					
Male	49.0%	49.2%	48.3%	49.3%	48.9%
Female	51.0	50.8	51.7	50.7	51.1
	100.0%	100.0%	100.0%	100.0%	100.0%
Age					
Under 16	27.8%	32.0%	19.7%	31.9%	26.8%
16 to 17	3.4	4.2	2.6	3.8	3.4
18 to 24	14.0	10.1	13.6	11.0	12.7
25 to 34	14.1	12.9	15.1	14.9	14.2
35 to 44	11.2	12.7	11.2	13.1	11.7
45 to 54	11.7	13.0	12.1	12.6	12.2
55 to 64	8.6	8.2	11.8	7.6	9.3
65 and over	9.2	6.9	13.9	5.1	9.7
	100.0%	100.0%	100.0%	100.0%	100.0%
Education Level (Population 25 years and older)					
Less than high school	37.0%	32.1%	38.2%	32.1%	36.0%
High school graduate	33.5	33.9	29.4	41.2	32.9
Some college	14.9	16.8	15.7	16.6	15.7
Four or more years of college	14.6	17.2	16.7	10.1	15.4
	100.0%	100.0%	100.0%	100.0%	100.0%
Annual Family Income--1975[b]					
Under $5,000	9.3%	7.0%	11.3%	5.0%	8.9%
$5,000 to $6,999	6.3	4.7	7.6	3.4	6.0
$7,000 to $9,999	9.3	7.4	11.1	6.5	9.1
$10,000 to $14,999	19.1	16.8	18.5	17.1	18.2
$15,000 to $24,999	35.9	38.2	31.0	43.7	35.9
$25,000 and over	20.1	25.9	20.5	24.3	21.9
	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnic/Racial Category					
White	67.2%	80.7%	57.2%	76.0%	68.1%
Black	15.0	7.4	13.4	2.4	11.8
Spanish-American[c]	12.6	9.3	14.2	16.5	12.7
Other	5.2	2.6	15.2	5.1	7.4
	100.0%	100.0%	100.0%	100.0%	100.0%
Total 1970 Population:	1,073,184	558,389	715,674	217,980	2,565,227

a. Cities of Daly City, Colma, Brisbane, Pacifica, South San Francisco, San Bruno, and Millbrae.
b. 1969 census income distribution adjusted to reflect the change in the total U.S. income distribution from 1969 to 1975 (see Appendix C).
c. This category is comprised of persons of Spanish tongue, all persons in families in which the head or wife reported Spanish as his or her mother tongue, and persons who have a Spanish surname.

Source: 1970 U.S. Census of Population and Housing.

Table 3

SOCIOECONOMIC CHARACTERISTICS OF THE BART SERVICE AREA POPULATION
(Population Aged 16 Years and Older)

Socioeconomic Characteristic	County of Residence: Alameda	Contra Costa	San Francisco	Northern San Mateo[a]	Total BART Service Area
Sex					
Male	48.3%	48.5%	47.7%	48.7%	48.2%
Female	51.7	51.5	52.3	51.3	51.8
	100.0%	100.0%	100.0%	100.0%	100.0%
Age					
16 to 17	4.7%	6.1%	3.2%	5.5%	4.6%
18 to 24	19.3	14.9	16.9	16.2	17.4
25 to 34	19.5	19.0	18.8	21.8	19.4
35 to 44	15.5	18.6	13.9	19.3	16.0
45 to 54	16.2	19.2	15.1	18.5	16.6
55 to 64	12.0	12.0	14.7	11.2	12.7
65 and over	12.8	10.2	17.4	7.5	13.3
	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnic/Racial Category					
White and other	75.1%	85.0%	76.6%	84.6%	78.3%
Black	13.6	6.7	11.1	1.9	10.5
Spanish-American[b]	11.3	8.3	12.3	13.5	11.2
	100.0%	100.0%	100.0%	100.0%	100.0%
1970 Population 16 years and older:	774,734	379,792	574,150	148,396	1,877,072

a. Cities of Daly City, Colma, Brisbane, Pacifica, South San Francisco, San Bruno, and Millbrae.
b. This category is comprised of persons of Spanish tongue, all persons in families in which the head or wife reported Spanish as his or her mother tongue, and persons who have a Spanish surname.

Source: 1970 U.S. Census of Population and Housing.

Alameda County. Alameda County contains 42% of the population, 42% of the urbanized area, and 37% of the jobs in the BART service area. Oakland and San Leandro are the major employment centers. In total, the County's population continues to grow, although the populations of the densely populated central cities of Oakland and Berkeley have declined since 1950. In 1970, the County contained a 33% nonwhite population and in 1975, 25% of families had annual incomes below $10,000; but in the central city of Oakland (which contains about 34% of the Alameda County population) the proportion of nonwhites and low-income families is much higher.

The BART System

A map of the 71-mile, 34-station BART System showing station names and the distribution of the System within the service area counties is given in Figure 1. At the time of the 1975 areawide survey and 1976 Passenger Profile Survey, all but one of the stations (Embarcadero in downtown San Francisco) were open. The System lies within the three Bay Area counties of San Francisco, Alameda, and Contra Costa, except for about 0.2 miles of line and the Daly City BART Station, which are in San Mateo County. Four BART lines radiate from the central Oakland section of the System. These are the Concord, Richmond, Fremont, and Daly City Lines to the east, north, south, and west, respectively.

BART service was introduced in the following stages:

- September 11, 1972--Opening of the Fremont Line
- January 29, 1973--Opening of the Richmond Line
- May 21, 1973--Opening of the Concord Line
- November 5, 1973--Opening of the Daly City Line to San Francisco's central business district (CBD)
- September 16, 1974--Start of transbay BART service
- November 28, 1975--Start of evening service, 8:00 p.m. to midnight

In May 1975, three direct BART services were operating: Fremont-Daly City, Concord-Daly City, and Fremont-Richmond (travelers between stations on the Richmond and Daly City Lines must transfer). The three lines operated from 6:00 a.m. to approximately 8:00 p.m., Monday through Friday, with scheduled headways between trains of about 12 minutes on each of the three services until the end of the evening peak period. Combined headways on the Daly City and Fremont Lines were about 6 minutes

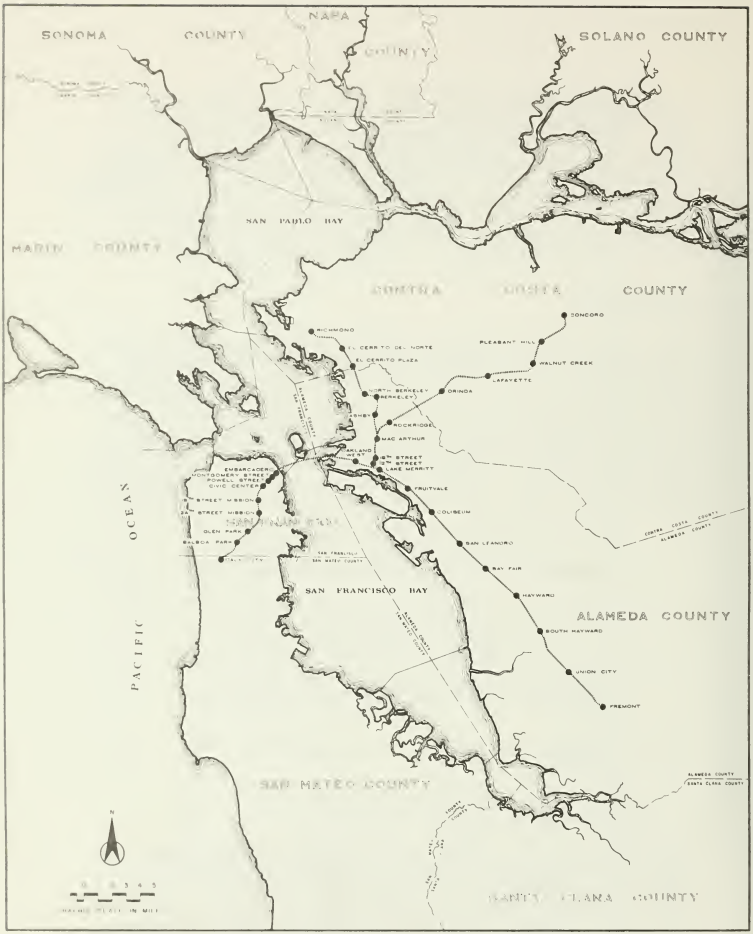

Figure 1

BAY AREA RAPID TRANSIT SYSTEM

during daytime hours of operation (increasing to 10 minutes after the evening peak). No late evening or weekend service was provided at the time of the May 1975 survey. As noted, late evening service was provided by the time of the 1976 PPS; otherwise, service provided at the times of the two surveys was essentially the same.

In May 1975, ridership on BART averaged 117,600 trips per day: 37,600 trips within the East Bay, 27,300 within the West Bay, and 52,600 transbay. In May 1976, ridership averaged 124,500 trips per day.*

The Highway System

As shown in Figure 2, each of the BART lines more or less parallels major freeways. The Daly City Line parallels I-280 and Route 101; the Richmond Line, I-80; the Concord Line, Route 24; and the Fremont Line, Route 17 (and to a lesser extent I-580). Oakland and the other East Bay cities are linked to the San Francisco Peninsula and Marin County by three major highway toll bridges: the San Francisco-Oakland Bay Bridge (generally known as the Bay Bridge), the San Mateo-Hayward Bridge, and the Richmond-San Rafael Bridge. The other major highway links highlighted in Figure 2 are the Golden Gate Bridge, linking Marin County to San Francisco, and the Caldecott Tunnel on Route 24 through the Berkeley Hills, linking central Contra Costa County to Berkeley and Oakland.

The most heavily traveled of these highway links is the San Francisco-Oakland Bay Bridge, which parallels the BART Transbay Tube and connects the freeways of the San Francisco Peninsula and the employment centers of San Francisco directly to Oakland and the freeways leading to the industrial and residential areas of the East Bay. The Bay Bridge carries about 95,000 vehicles per day in each direction.

Other Transit Services

The area served by BART is also served by a number of other transit operators. The most important of these are:

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*The BART Department of Planning, Budgeting and Research monthly patronage reports show that May 1976 patronage averaged 136,200 trips per day. However, this figure includes the additional trips gained by the BART System as the result of the San Francisco Municipal Railway (MUNI) strike. The lower ridership figure used here (124,500 daily trips) is used because it more accurately represents typical BART patronage.

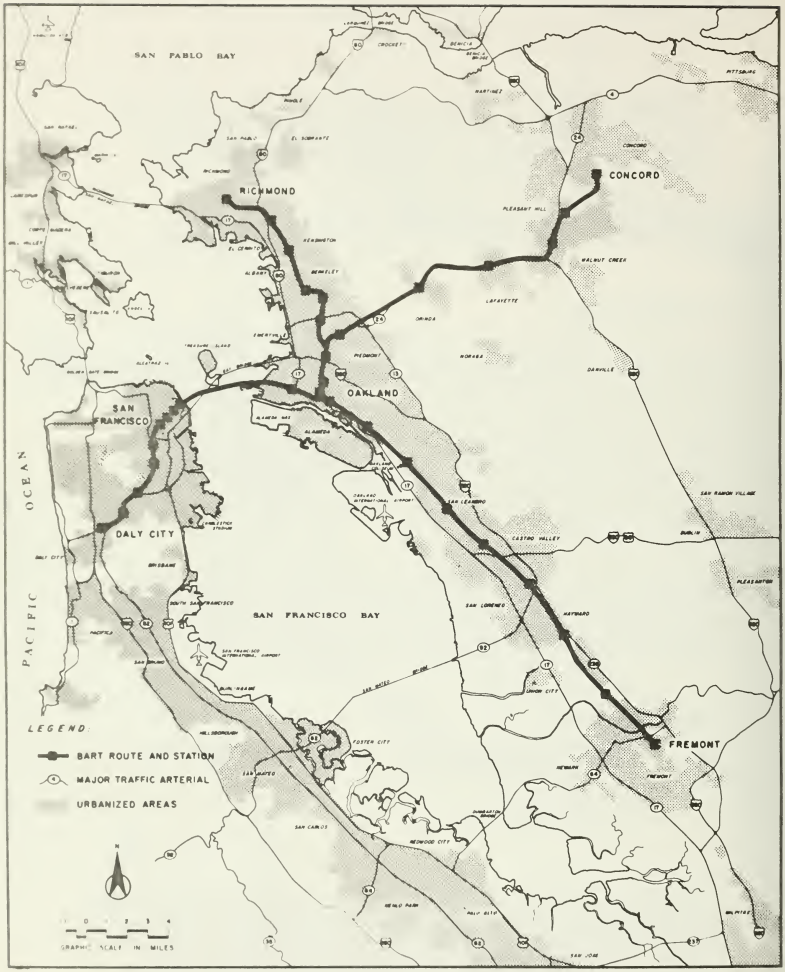

Figure 2

BAY AREA HIGHWAY SYSTEM AND BART

Alameda-Contra Costa Transit District (AC Transit). As the major bus operator in the East Bay, AC Transit provides scheduled bus service in the cities west of the Berkeley and San Leandro Hills from Richmond in the north to Fremont in the south, an area of approximately 200 square miles with a population of over one million. In May 1975, all 20 BART stations on the Richmond and Fremont Lines, the Rockridge Station on the Concord Line, and the West Oakland Station on the Daly City Line were in the AC Transit service area. Also, in May 1975, AC Transit was providing "Dial-a-Ride" service in Richmond but this Dial-a-Ride service was discontinued in August 1975. Ridership on these services averaged 146,100 trips per weekday in May 1975. By the time of the May 1976 PPS, AC Transit had added feeder bus services to the Concord, Pleasant Hill, and Orinda Stations, ridership on these services totaling 2,100 trips daily.

In addition to local and express bus service in the East Bay, AC Transit operates extensive bus routes across the San Francisco-Oakland Bay Bridge to the transbay bus terminal on the edge of downtown San Francisco. Ridership on AC Transit's transbay lines in May 1975 averaged 43,800 trips per weekday.

Under contract to the BART District, AC Transit also operates "BART Express Bus" service to and from those portions of the BART District beyond the immediate service area of BART stations. Service on five Express Bus routes began in late 1974: from the Pinole area in northern Contra Costa County to the El Cerrito Del Norte BART Station (Q Line); from Dublin, San Ramon, Danville, and Alamo to the Walnut Creek Station (D Line); from Martinez and Pleasant Hill in central Contra Costa County to the Concord Station (M Line); from Brentwood, Oakley, Antioch, Pittsburg, and West Pittsburg to the Concord Station (P Line); and from Livermore, Pleasanton, Dublin, and San Ramon in Central Alameda County to the Hayward and Bay Fair Stations (U Line). Ridership on these lines totaled 2,400 trips per weekday in May 1975. In May 1976 AC Transit ridership, including BART Express Bus ridership, totaled 199,800 trips per weekday.

San Francisco Municipal Railway (MUNI). MUNI provides bus, trolley, streetcar, and cable car service to the entire City of San Francisco, an area of 46 square miles with a population of slightly under 700,000. MUNI provides bus feeder service to all BART stations in San Francisco. It also serves the Daly City Station in San Mateo County. MUNI's ridership averaged 364,000 trips per weekday in May 1975.

Greyhound Bus Lines. Greyhound commuter buses serve the area east of the Berkeley Hills in central Contra Costa County, which is also served by the BART stations on the Concord Line (except Rockridge). Greyhound commuter service consists mainly of express service between

terminals in Orinda, Lafayette, Walnut Creek, Concord, and downtown San Francisco. Transbay BART service greatly reduced Greyhound ridership on these services. In May 1975, average ridership was 2,900 trips per day; by May 1976, it had dropped to 1,800 trips. Greyhound's Vallejo-San Francisco route runs through Pinole, parallel to BART's Express Bus Q Line. Greyhound also provided bus service between cities in San Mateo County and San Francisco.

Southern Pacific Railroad. Southern Pacific furnishes commuter rail service between San Francisco and cities on the San Francisco Peninsula in San Mateo and Santa Clara Counties. Weekday ridership to or from San Francisco averages about 16,000 trips. In the area of northern San Mateo County included in the 1975 survey, Southern Pacific has stations in South San Francisco, San Bruno, and Millbrae.

Transfer Procedures. Travelers using AC Transit or MUNI to connect with BART pay only half the normal round-trip bus fare, but different transfer procedures apply for the two systems. AC Transit passengers pay the regular bus fare for their trip to the BART station. On their return trip, they can obtain a free transfer ticket in the BART station for a bus ride to any destination within the same fare zone. MUNI passengers can purchase a two-part ticket for the price of one regular ticket ($0.25) in BART stations. One part of the ticket is valid for the transfer from BART to MUNI, and the second part is valid for a return trip. The ticket bears the name of the BART station where it was issued and is valid for three days.*

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*Analyses of BART's impacts on highway traffic volumes and congestion and on bus ridership are given in another TSTB Project report: BART Impacts on Highway Traffic and Transit Ridership, BART Impact Program, Document No. TM 20-3-76, May 1977.

IV. SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS

This chapter tabulates socioeconomic characteristics of BART travelers from the 1976 BART Passenger Profile Survey (PPS) according to the following stratifications:

Table 4: Peak and Off-Peak Travel

Table 5: Trip Purpose

Table 6: East Bay, West Bay, and Transbay Travel

Table 7: Previous Mode

Table 8: Origin BART Station

The third column of Table 4 shows the socioeconomic characteristics distribution of BART travelers as computed from data for the total 6:00 a.m. to 3:00 p.m. PPS period (representing 66,800 trips). As discussed in Chapter II, these data slightly underrepresent peak and overrepresent off-peak trips. The fifth column of Table 4 (representing the 124,500 all-day trips) shows the corresponding socioeconomic distributions with compensation made for this bias. Comparison of the third and fifth columns of the table shows negligible differences. Thus, biases attributable to the underrepresentation of peak-period travel appear to be negligible as far as the socioeconomic characteristics of BART travelers are concerned. Consequently, all percentages given in Tables 5, 6, 7, and 8 are based straightforwardly on data for the 6:00 a.m. to 3:00 p.m. survey period (representing a total of 66,800 trips) without further adjustment for peak/off-peak imbalances. In Table 8, the percentages are based on only those travelers making the first leg of a round trip during the survey period. The daily patronage and the base for the percentages for each station can be found in Table 18, Chapter V.

In the following text, the differences commented on are statistically significant at the 95% confidence level unless otherwise stated. The statistical significance of differences between percentages not mentioned in the text may be judged by reference to the table given in Appendix D.

Comparison with Census

The sex, age, education, income, and race of BART travelers may be compared with the distributions of the same characteristics for the population of the BART service area as a whole by comparing the "total all day" BART rider distributions given in Table 4 with the census distributions of sex, age, and race given in Table 3 (for the population aged 16 years and older)

Table 4

SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS
ACCORDING TO TIME PERIOD

Socioeconomic Characteristic	Time Period: Morning Peak Period (6:00 a.m. to 8:59 a.m.)	Time Period: Off-Peak Period (9:00 a.m. to 3:00 p.m.)	Time Period: Total Survey Period (6:00 a.m. to 3:00 p.m.)	Total Trips Represented During Survey Period	Total All Day (6:00 p.m. to midnight)	Total All Day Trips Represented
Sex						
Male	49.2%	53.9%	51.5%	34,400	50.8%	63,300
Female	50.8	46.1	48.5	32,400	49.2	61,200
	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Age						
16 to 17	1.7%	3.1%	2.4%	1,600	2.2%	2,700
18 to 24	21.6	28.7	25.0	16,700	24.0	29,900
25 to 34	36.6	30.9	33.8	22,600	34.7	43,100
35 to 54	31.5	22.6	27.2	18,100	28.5	35,400
55 to 64	6.6	7.4	7.0	4,700	6.9	8,600
Over 64	2.0	7.3	4.6	3,100	3.8	4,800
	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Education Level						
Less than high schoool	3.3%	6.2%	4.7%	3,200	4.3%	5,400
High school graduate	14.7%	15.6%	15.1%	10,100	15.0	18,700
Some college	39.9	40.0	40.0	26,700	39.9	49,700
4-year college graduate	18.4	15.1	16.8	11,200	17.3	21,500
More than 4 years of college	23.7	23.1	23.4	15,600	23.5	29,200
	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Annual Family Income						
Under $7,000	12.4%	27.0%	19.4%	13,000	17.4%	21,600
$7,000 to $9,999	12.3	12.7	12.5	8,400	12.4	15,500
$10,000 to $14,999	19.2	18.0	18.6	12,400	18.8	23,400
$15,000 to $24,999	32.7	25.2	29.1	19,400	30.1	37,500
$25,000 and over	23.4	17.1	20.4	13,600	21.3	26,500
	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Ethnic/Racial Category						
White	71.7%	73.5%	72.7%	48,600	72.3%	90,000
Black	11.5	10.9	11.2	7,500	11.3	14,100
Spanish-American	5.5	6.4	5.9	3,900	5.8	7,200
Asian	9.7	7.1	8.4	5,600	8.8	11,000
Other	1.6	2.1	1.8	1,200	1.8	2,200
	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Unweighted Sample Size:	4,278	3,864	8,142		8,142	
Number of Trips Represented:	34,400	32,400	66,800		124,500	
Percent of Trips Represented:	27.6%	26.0%	53.7%		100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

and the census distributions of education (for the population aged 25 years and older) and annual family income (for the total population) given in Table 2. Comparison of the BART rider data with the 16-and-over census data (where available) is appropriate because "under high school age" children were not sampled in the PPS.

Relative to the service area population, BART travelers contain a slightly higher percentage of males, are younger, and better educated. However, the latter comparison is complicated by the fact that the census distribution is only for those 25 years and older, while the BART rider distribution is for all those 16 years and older. Overall, the census and BART rider distributions of income are similar.

With regard to race, BART ridership contains about the same percentage of blacks (11.3%) as are present in the adult population in total (10.5%), but BART's ridership contains significantly fewer Spanish-Americans (5.8%) than are present in the census adult population (11.2%). However, the latter comparison may be misleading because of possible ambiguity in the distinction between "white" and "Spanish-American." For example, people who are defined in the census as "Spanish-American" may well have indicated "white" as their race on the travel survey.

Of course, some of the differences between the characteristics of BART riders and the characteristics of the population as given by the census are attributable to the fact that the population of regular tripmakers (by BART and all other modes) is different from the total population. (Older people make fewer trips than younger people, for example.) A comparison of the socioeconomic characteristics of all tripmakers, stratified by mode, is given in Chapter VI.

Peak and Off-Peak Travel

Peak-period trips are defined as those starting (entering BART) between 6:00 a.m. and 9:00 a.m. Off-peak trips are defined as those beginning between 9:00 a.m. and 3:00 p.m. As shown in Table 4, peak-period travelers have a lower percentage of males, have higher family incomes, and are more likely to be in the 25-to-55 age bracket. Minorities are shown as making up a higher proportion of peak than off-peak ridership; however, the difference is not statistically significant at the 95% confidence level.

Trip Purpose

Table 5 compares the socioeconomic characteristics of BART travelers according to trip purpose. The 1976 PPS asked the respondent where he started his trip and where he was going. The following trip purposes were assigned to reported origin/destination pairs.

Assigned Trip Purpose	Reported From	Reported To
Work	Home	Work
Work	Work	Home
Business	Work	Work
School	Home	School
School	School	Home
Personal Business	Home	Shopping, Medical, Personal Business
Personal Business	Shopping, Medical, Personal Business	Home
Other	(All other combinations including recreation trips and trial BART rides)	

As shown in Table 5, 58.8% of all BART trips from 6:00 a.m. to 3:00 p.m. are trips between home and work and another 3.3% are for business reasons. People traveling for work or business reasons are older than people traveling for school, personal business, or other reasons. Business travelers contain a higher proportion of whites and males. They are also more educated and have the highest annual family incomes. A greater percentage of minorities travel to or from school than for any other purpose.

East Bay, West Bay, and Transbay Travel

Table 6 compares the socioeconomic characteristics of BART travelers according to the area of travel. The table shows that transbay travelers are predominantly male, while East Bay and West Bay travelers are predominantly female. The age distributions show only minor differences among the three travel areas. Transbay travelers are more educated than East Bay and West Bay travelers and have higher annual family incomes. Transbay and East Bay travelers have similar ethnic distributions. West Bay ridership contains a considerably higher proportion of minorities.

Table 5

SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS
ACCORDING TO TRIP PURPOSE

Socioeconomic Characteristics	Purpose						Total Trips Represented During Survey Period
	Work	Business	School	Personal Business	Other	Total	
Sex							
Male	51.2%	76.8%	53.2%	43.8%	51.3%	51.5%	34,400
Female	48.8	23.2	46.8	56.2	48.7	48.5	32,400
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Age							
16 to 17	0.5%	0.4%	8.1%	3.7%	4.4%	2.4%	1,600
18 to 24	18.8	3.8	60.2	20.8	29.0	25.0	16,700
25 to 34	38.1	44.6	24.7	25.0	28.8	33.8	22,600
35 to 54	33.0	38.8	6.2	23.7	21.2	27.2	18,100
55 to 64	59.0	10.5	0.4	11.3	8.1	7.0	4,700
Over 64	2.6	1.9	0.4	15.5	8.5	4.6	3,100
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Education Level							
Less than high school	3.0%	0.8%	6.7%	10.1%	6.7%	4.7%	3,200
High school graduate	15.1	10.3	8.3	20.3	17.4	15.1	10,100
Some college	37.9	21.3	61.5	35.1	39.6	40.0	26,700
4-year college graduate	18.8	24.9	8.7	15.8	14.1	16.8	11,200
More than 4 years of college	25.2	42.7	14.8	18.7	22.2	23.4	15,600
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Annual Family Income							
Under $7,000	12.3%	6.8%	39.2%	26.9%	30.0%	19.4%	13,000
$7,000 to $9,999	12.5	5.8	13.1	11.8	13.5	12.5	8,400
$10,000 to $14,999	19.6	8.6	16.4	20.2	17.5	18.6	12,400
$15,000 to $24,999	32.7	36.0	19.5	25.2	23.3	29.1	19,400
$25,000 and over	22.9	42.8	11.8	15.9	15.7	20.4	13,600
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Ethnic/Racial Category							
White	72.5%	83.1%	62.8%	77.2%	75.1%	72.7%	48,600
Black	11.9	6.4	14.1	8.3	9.9	11.2	7,500
Spanish-American	6.1	3.1	5.7	6.8	5.1	5.9	3,900
Asian	8.2	5.5	14.5	5.6	7.0	8.4	5,600
Other	1.3	1.9	2.9	2.1	2.9	1.8	1,200
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Unweighted Sample Size:	4,805	247	993	944	1,153	8,142	
Number of Trips Represented:	39,300	2,200	8,100	7,400	9,800	66,800	
Percent of Trips Represented:	58.8%	3.3%	12.1%	11.1%	14.7%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row torals shown.

Source: 1976 BART Passenger Profile Survey.

Table 6

SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS
ACCORDING TO TRAVEL AREA

Socioeconomic Characteristic	Travel Area				Total Trips Represented During Survey Period
	East Bay	West Bay	Transbay	Total	
Sex					
Male	47.7%	42.6%	58.7%	51.5%	34,400
Female	52.3	57.4	41.3	48.5	32,400
	100.0%	100.0%	100.0%	100.0%	66,800
Age					
16 to 17	3.7%	2.8%	1.0%	2.4%	1,600
18 to 24	31.1	24.1	20.6	25.0	16,700
25 to 34	30.0	36.2	35.6	33.8	22,600
35 to 54	23.4	26.3	30.7	27.2	18,100
55 to 64	6.6	7.4	7.1	7.0	4,700
Over 64	5.2	3.2	5.0	4.6	3,100
	100.0%	100.0%	100.0%	100.0%	66,800
Education Level					
Less than high school	5.9%	6.1%	2.7%	4.7%	3,200
High school graduate	17.3	18.1	11.6	15.1	10,100
Some college	43.6	42.4	35.7	40.0	26,700
4-year college graduate	12.9	15.2	20.9	16.8	11,200
More than 4 years of college	20.2	18.2	29.1	23.4	15,600
	100.0%	100.0%	100.0%	100.0%	66,800
Annual Family Income					
Under $7,000	25.0%	17.8%	15.8%	19.4%	13,000
$7,000 to $9,999	13.3	15.0	10.3	12.5	8,400
$10,000 to $14,999	18.1	22.1	17.1	18.6	12,400
$15,000 to $24,999	27.8	30.0	29.8	29.1	19,400
$25,000 and over	15.8	15.1	27.0	20.4	13,600
	100.0%	100.0%	100.0%	100.0%	66,800
Ethnic/Racial Category					
White	73.5%	64.1%	77.0%	72.7%	48,600
Black	12.2	11.9	10.1	11.2	7,500
Spanish-American	5.4	10.2	3.7	5.9	3,900
Asian	6.4	12.2	7.8	8.4	5,600
Other	2.5	1.6	1.4	1.8	1,200
	100.0%	100.0%	100.0%	100.0%	66,800
Unweighted Sample Size:	3,232	1,441	3,469	8,142	
Number of Trips Represented:	21,800	16,900	28,100	66,800	
Percent of Trips Represented:	32.7%	25.3%	42.0%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

Previous Mode

Table 7 presents the socioeconomic characteristics of BART travelers according to the mode used before BART. According to the table, the drive-alone mode was used most frequently by males, while the bus was used most frequently by females. The education level and annual family income distributions show that highly educated BART travelers (college level) or those with high family incomes ($15,000 and above) relied more on the automobile as a previous mode. A higher percentage of whites drove automobiles or carpooled before BART than used the bus. Conversely, a higher percentage of minorities used bus.

Origin BART Station

Table 8 gives socioeconomic data for BART travelers, stratified by BART station. The data shown are for BART travelers surveyed as they entered a BART station on the first leg of a round trip. Thus most trips are from home so the percentages given in the table approximate the distributions of socioeconomic characteristics for BART travelers resident in each station's catchment area.

Table 7

SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS
ACCORDING TO PREVIOUS MODE[a]

Socioeconomic Characteristic	Previous Mode						Total Trips Represented
	Bus	Drove Alone	Car Pool	Walk	Other	Total	
Sex							
Male	39.4%	57.1%	40.4%	54.8%	60.6%	46.4%	22,500
Female	60.6	42.9	59.6	45.2	39.4	53.6	26,000
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Age							
16 to 17	2.1%	0.5%	4.5%	8.2%	5.8%	2.1%	1,000
18 to 24	21.1	17.9	26.2	34.1	22.9	21.0	10,200
25 to 34	32.7	36.5	28.7	21.7	41.5	33.4	16,200
35 to 54	29.9	30.8	28.0	19.2	25.3	29.7	14,400
55 to 64	9.0	7.8	7.6	11.4	4.5	8.2	4,000
Over 64	5.2	6.5	5.0	5.4	--	5.6	2,700
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Education Level							
Less than high school	5.2%	2.5%	4.4%	24.8%	7.5%	4.3%	2,100
High school graduate	17.0	11.6	15.9	27.4	13.5	14.9	7,200
Some college	41.5	38.1	40.7	23.5	36.3	39.8	19,300
4-year college graduate	15.8	19.5	18.1	10.4	16.0	17.5	8,500
More than 4 years of college	20.5	28.3	20.9	13.9	26.7	23.5	11,400
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Annual Family Income							
Under $7,000	20.9%	13.0%	16.2%	47.3%	28.8%	17.5%	8,500
$7,000 to $9,999	14.6	9.6	8.3	19.1	20.3	11.7	5,700
$10,000 to $14,999	18.8	19.3	17.5	12.9	9.1	18.6	9,000
$15,000 to $24,999	27.8	32.7	32.6	14.0	27.4	30.3	14,700
$25,000 and over	17.9	25.4	25.4	6.7	14.4	21.9	10,600
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Ethnic/Racial Category							
White	65.6%	78.1%	74.6%	64.8%	73.6%	79.1%	34,900
Black	15.2	8.9	8.2	20.7	5.5	11.5	5,600
Spanish-American	7.5	4.3	5.4	7.8	10.8	6.0	2,900
Asian	9.9	7.1	9.6	5.7	2.8	8.7	4,200
Other	1.8	1.6	2.2	1.0	7.3	1.9	900
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Unweighted Sample Size:	2,422	2,297	1,040	70	77	5,906	
Number of Trips Represented:	20,600	18,000	8,700	600	600	48,500	
Percent of Trips Represented:	42.5%	37.1%	17.9%	1.2%	1.3%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

a. Includes only those travelers who made the same trip before BART.

Source: 1976 BART Passenger Profile Survey.

Table 8

SOCIOECONOMIC CHARACTERISTICS OF BART TRAVELERS
ACCORDING TO ORIGIN STATION[a]

Station	Sex		Age				Education Level				Annual Family Income					Ethnic/Racial Category				
	Male	Female	16 to 17	18 to 34	35 to 64	Over 64	Less Than High School	High School	Some College	4 Years of College	More than 4 Years of College	Under $7,000	$7,000 to $9,999	$10,000 to $14,999	$15,000 to $24,999	$25,000 or More	White	Black	Spanish-American	Asian	Other
Concord	57.2%	42.8%	1.1%	58.4%	37.4%	3.1%	2.1%	12.3%	35.7%	22.7%	27.2%	12.8%	8.9%	18.7%	35.8%	23.8%	84.2%	2.6%	5.0%	6.5%	1.7%
Pleasant Hill	60.4	39.6	1.6	46.1	49.7	2.6	2.1	12.6	34.2	21.0	30.1	8.3	6.2	15.2	30.2	40.1	90.0	2.4	2.2	4.2	1.2
Walnut Creek	56.0	44.0	4.3	43.7	47.9	9.1	5.7	10.2	33.0	21.2	29.9	9.0	8.2	15.1	29.4	38.3	92.4	2.0	1.7	3.9	0.0
Lafayette	65.1	34.9	0.4	39.6	55.4	4.6	1.7	8.7	27.7	23.5	38.4	6.4	4.9	12.2	35.9	40.6	94.4	1.4	1.1	2.9	0.0
Orinda	64.9	35.1	2.5	38.6	57.5	1.4	0.8	8.4	24.2	25.2	41.4	6.0	1.5	7.9	24.0	60.6	94.8	0.9	0.3	2.8	1.2
Rockridge	55.8	44.2	0.3	62.9	29.2	7.6	1.3	9.4	28.9	21.3	39.1	20.6	11.4	15.0	25.1	27.9	86.7	5.0	2.6	4.5	1.7
Richmond	41.0	59.0	6.4	61.4	27.5	4.7	9.0	23.3	40.9	10.1	16.7	32.3	15.4	21.5	23.2	7.6	57.3	31.9	7.4	2.9	0.5
El Cerrito del Norte	45.2	54.8	3.1	56.9	36.2	3.8	4.5	19.2	45.5	15.5	15.3	19.4	11.5	16.4	36.0	16.7	77.0	12.2	2.5	7.3	1.0
El Cerrito Plaza	47.2	52.8	3.9	54.6	35.0	6.5	6.0	16.1	37.4	16.1	24.4	22.0	8.5	37.3	25.3	17.0	76.5	7.7	3.1	10.7	2.0
North Berkeley	45.2	54.8	2.4	62.5	28.7	6.4	2.2	7.3	35.0	16.0	39.5	25.1	10.4	20.2	31.5	12.8	70.5	16.9	1.2	9.0	2.4
Berkeley	57.3	42.7	2.7	73.6	20.1	3.6	2.9	10.1	32.2	18.7	36.1	46.5	11.2	15.8	13.1	13.4	81.6	4.4	5.0	6.5	0.5
Ashby	53.2	46.8	1.6	76.4	20.1	1.9	3.1	9.9	40.9	17.3	20.8	41.4	17.5	14.5	20.2	6.4	65.1	23.0	3.7	4.6	3.6
Fremont	51.6	48.4	1.5	55.0	40.3	3.2	4.7	16.5	43.0	16.9	18.9	14.0	8.0	15.9	38.4	23.7	80.3	7.4	3.9	7.1	1.3
Union City	41.2	58.8	1.1	62.3	36.6	0.0	5.2	19.5	40.1	18.0	17.2	11.9	12.2	13.4	42.8	19.7	65.7	6.9	12.5	12.4	2.5
South Hayward	42.8	57.2	2.2	60.9	32.9	4.0	5.2	23.3	42.2	10.9	18.4	16.0	12.7	20.0	38.1	13.2	69.1	2.5	11.2	10.6	1.6
Hayward	47.9	52.1	1.8	56.9	37.0	4.3	6.7	21.3	40.2	12.6	19.2	18.9	11.5	21.8	28.0	19.8	75.9	7.7	10.1	4.3	2.0
Bay Fair	46.7	53.1	1.3	62.9	32.0	3.8	2.3	17.8	54.8	10.0	15.3	11.0	12.5	16.8	37.9	19.8	87.3	2.3	3.6	4.6	2.2
San Leandro	43.2	56.8	0.6	50.6	40.7	8.1	5.0	22.1	47.1	13.7	11.1	17.1	10.2	28.9	29.0	14.8	78.5	4.0	6.1	5.6	5.8
Coliseum	45.5	54.5	5.0	67.7	26.8	0.5	8.1	19.4	50.0	8.9	13.6	18.7	25.5	17.1	25.8	13.9	33.8	53.9	5.6	4.4	2.5
Fruitvale	54.3	45.7	4.6	60.8	29.6	5.0	4.2	17.5	40.1	18.7	19.5	18.4	16.0	22.3	17.6	15.7	65.1	20.6	9.3	3.6	1.4
Lake Merritt	47.4	52.6	0.0	71.2	26.4	2.4	1.7	18.1	46.2	8.6	25.4	24.5	16.3	17.7	26.2	15.3	56.0	22.8	3.3	16.7	1.2
19th Arthur	53.0	47.0	1.1	61.3	31.7	6.1	4.9	13.9	38.2	18.0	25.0	26.6	16.6	16.3	18.0	22.5	60.9	22.2	2.5	8.8	5.6
19th Street Oakland	52.5	47.5	1.1	55.4	32.9	10.6	4.8	16.2	38.7	14.2	26.1	14.4	20.9	21.2	30.0	13.5	72.9	13.3	2.8	7.2	3.8
12th Street Oakland	59.7	40.3	0.7	70.4	21.3	7.6	5.4	16.9	47.2	15.2	15.3	36.8	9.9	19.7	21.0	12.6	55.3	29.4	2.1	10.0	3.2
Oakland West	61.6	38.4	1.0	61.6	36.5	0.9	2.1	9.0	34.2	24.3	30.4	7.4	13.4	15.6	32.0	31.6	66.1	21.9	2.5	6.4	1.1
Daly City	19.8	40.2	2.5	53.6	37.9	4.0	4.5	19.6	46.0	16.1	15.8	10.0	12.4	24.5	34.3	18.8	64.2	14.0	5.7	14.6	1.5
Balboa Park	48.9	61.1	2.1	58.7	37.3	1.9	6.0	14.7	50.2	16.8	12.3	16.9	7.7	21.3	36.3	17.8	56.7	18.8	10.6	10.7	3.2
Glen Park	41.8	56.2	1.6	57.5	36.1	4.8	2.4	14.8	42.7	12.0	28.1	10.1	10.8	20.5	39.3	19.3	69.6	8.3	8.9	13.2	0.0
24th Street Mission	49.4	50.6	2.1	69.5	26.2	2.2	7.0	18.1	36.8	21.3	16.8	26.7	21.8	21.8	22.0	7.7	60.8	5.5	26.7	5.4	1.6
16th Street Mission	57.1	42.7	1.4	63.2	34.8	0.6	5.4	18.8	35.7	18.9	22.0	27.0	24.5	21.3	19.1	8.1	68.9	3.4	17.0	7.6	3.1
Civic Center	67.9	32.1	1.5	71.6	23.6	1.3	5.5	12.2	36.9	17.0	28.4	43.3	19.8	13.8	13.3	5.8	63.7	18.6	9.1	8.6	0.0
Powell	56.0	44.0	1.4	63.4	30.2	5.0	3.1	19.1	43.7	15.2	18.9	26.8	17.1	20.2	22.4	13.5	64.6	10.8	5.0	18.2	1.4
Montgomery[b]	67.2	32.8	2.7	47.2	51.5	3.6	3.9	10.6	29.6	24.1	11.8	8.0	4.7	15.7	36.7	34.9	80.8	6.5	0.8	9.1	2.8
Embarcadero[b]																					

a. Data are for BART travelers surveyed entering stations on the first leg of a round trip; i.e., nearly all are trips from home.
b. Embarcadero Station was not open at time of survey.

Source: 1976 BART Passenger Profile Survey.

V. CHARACTERISTICS OF TRIPS USING BART

This chapter tabulates the characteristics of BART trips from the 1976 Passenger Profile Survey (PPS) according to the following stratifications:

Table 9:	Peak and Off-Peak Travel
Table 10:	Trip Purpose
Table 11:	East Bay, West Bay, and Transbay Travel (Estimated 6:00 a.m. to midnight trips)
Table 12:	East Bay, West Bay, and Transbay Travel (6:00 a.m. to 3:00 p.m. survey period trips only)
Table 13:	Previous Mode
Table 14:	Reasons for New BART Trips
Table 15:	Mode Used To Get to BART
Table 16:	Mode Used To Get from BART
Table 17:	Origin BART Station (Purpose, Time, and Frequency of Travel)
Table 18:	Origin BART Station (Access Trip Characteristics)

The third column of Table 9 shows the trip characteristics distribution of BART trips as computed from data for the 6:00 a.m. to 3:00 p.m. period of the PPS (representing 66,800 trips). As discussed in Chapter II, these data slightly underrepresent peak and overrepresent off-peak trips. The fifth column of Table 9 shows the corresponding distributions estimated for the entire 6:00 a.m. to midnight BART service day (representing 124,500 trips), with compensation made for the peak/off-peak bias. Comparison of the third and fifth columns of Table 9 shows significant differences in the trip purpose distributions, with the percentage of work-purpose trips being significantly higher in the total all-day estimate (66.8%) than in the total survey period estimate (58.8%). However, the distribution of other trip characteristics shown in columns three and five is generally close, suggesting that the biases attributable to the underrepresentation of peak-period travel are small as far as these other trip characteristics are concerned. (Travel frequency is the only notable exception.) Consequently, all percentages given in Tables 10, 12, and 13 through 18 are based straightforwardly on data for the 6:00 a.m. to 3:00 p.m. survey period (representing a total of 66,800 trips), without

Table 9

BART TRIP CHARACTERISTICS
ACCORDING TO TIME PERIOD

Trip Characteristic	Time Period: Morning Peak Period (6:00 a.m. to 8:59 a.m.)	Off-Peak Period (9:00 a.m. to 3:00 p.m.)	Total Survey Period (6:00 a.m. to 3:00 p.m.)	Total Trips Represented During Survey Period	Total All Day (6:00 a.m. to 12:00 midnight)	Total All-Day Trips Represented
Trip Purpose						
Work	87.0%	27.8%	58.8%	39,300	66.8%	83,100
Business	0.2	6.6	3.3	2,200	2.4	3,000
School	8.9	15.6	12.1	8,100	11.2	13,900
Personal Business	1.3	22.3	11.1	7,400	8.5	10,600
Other	2.6	27.7	14.7	9,800	11.1	13,900
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Travel Area						
East Bay	33.7%	32.7%	33.2%	21,800	33.3%	41,400
West Bay	26.0	24.2	25.1	16,900	24.8	30,900
Transbay	40.3	43.1	41.7	28,100	41.9	52,200
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Total Travel Time						
Under 16 minutes	4.1%	7.4%	5.6%	3,700	5.2%	6,500
16 to 30 minutes	23.3	27.7	25.2	16,800	24.7	30,800
31 to 45 minutes	26.9	21.6	24.5	16,400	25.5	31,700
46 to 60 minutes	28.6	21.4	25.4	17,000	25.7	32,000
Over 60 minutes	17.1	21.9	19.3	12,900	18.9	23,500
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Average in minutes	46.5	45.7	46.2		46.3	
Travel Time on BART						
Under 16 minutes	21.6%	29.6%	25.2%	16,800	24.0%	29,900
16 to 30 minutes	33.5	30.0	31.9	21,300	32.5	40,500
31 to 45 minutes	24.8	18.7	22.1	14,800	23.0	28,600
46 to 60 minutes	14.7	10.9	13.0	8,700	13.5	16,800
Over 60 minutes	5.4	10.8	7.8	5,200	7.0	8,700
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Average in minutes	33.3	33.2	33.2		33.2	
Travel Frequency						
5 days per week	76.2%	32.7%	55.3%	37,000	61.3%	76,400
3 to 4 days per week	12.7	17.7	15.1	10,100	14.4	17,900
1 to 2 days per week	4.7	17.3	10.8	7,200	9.0	11,200
Less than once per week	4.9	24.8	14.4	9,600	11.7	14,600
Trial trip	1.5	7.5	4.4	2,900	3.6	4,400
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Did you make this trip before BART was operating?						
Yes	70.9%	74.4%	72.6%	48,500	72.2%	89,800
No	29.1	25.6	27.4	18,300	27.8	33,700
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Previous Travel Mode						
Bus or streetcar	44.7%	40.1%	42.5%	20,600	43.1%	38,700
Drove alone	36.1	38.1	37.1	18,000	36.8	33,000
Car pool	16.9	18.8	17.9	8,700	17.6	15,800
Walk	0.7	1.9	1.2	600	1.1	1,000
Other	1.6	1.1	1.3	600	1.4	1,300
Total	100.0%	100.0%	100.0%	48,500	100.0%	89,800
Would you make this trip if BART were not operating?						
Yes	98.0%	93.6%	95.9%	64,100	96.5%	120,100
No	2.0	6.4	4.1	2,700	3.5	4,400
Total	100.0%	100.0%	100.0%	66,800	100.0%	124,500
Unweighted Sample Size:	4,268	3,874	8,142		8,142	
Number of Trips Represented:	34,400	32,400	66,800		124,500	
Percent of Trips Represented:	27.6%	26.0%	53.7%		100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

adjustment for peak/off-peak imbalances. Table 11 gives distributions corresponding to Table 12 but adjusted for the peak/off-peak imbalances (and representing the 124,500 all-day trip total). In Tables 17 and 18, the percentages are based on only those travelers making the first leg of a round trip during the survey period. The daily patronage and the base for the percentages for each station can be found in Table 18.

In the following text, the differences commented on are statistically significant at the 95% confidence level unless otherwise stated. The statistical significance of differences between percentages not mentioned in the text may be judged by reference to the table given in Appendix D.

Peak and Off-Peak Travel

As shown in Table 9, the characteristics of peak-period and off-peak trips are substantially different. The table shows that 87.0% of morning peak-period trips are work trips, while only 27.8% of off-peak trips are between home and work. There are also proportionately fewer very long and very short trips in the peak, although the average travel time in the peak and off-peak is similar (about 46 minutes). Peak trips are made more frequently (76.2% on five days a week or more) than are off-peak trips (32.7%). A higher proportion of peak trips were diverted from bus or streetcar (44.7%) than off-peak trips (40.1%).

Trip Purpose

Table 10 shows characteristics of BART trips according to trip purpose. Among BART school trips, 56.6% are made in the East Bay. Of business trips on BART, 62.7% are made transbay. The total travel time distribution shows that business trips are generally the shortest trips made, while school trips are the longest trips made. People traveling to or from work use BART more frequently than people traveling for any other reason. Personal business trips are the least frequently made trips. More people traveling to or from school did not make the trip before BART than people traveling for any other reason. Work-purpose trips contain the highest percentage (45.0%) of trips previously made by bus or streetcar; business trips contain the highest percentage (58.5%) of trips previously using the drive-alone mode. If BART discontinued service, Table 10 indicates business and other trips would decrease more than work, school, and personal business trips.

East Bay, West Bay, and Transbay Travel

Tables 11 and 12 present the characteristics of BART trips according to travel area. Large differences between the two tables are apparent in the trip-purpose and travel-frequency distributions. As described earlier, Table 12 accounts for the underrepresentation of peak-period trips and, consequently, gives better estimates of the characteristics

Table 10

BART TRIP CHARACTERISTICS
ACCORDING TO TRIP PURPOSE

Trip Characteristic	Trip Purpose: Work	Business	School	Personal Business	Other	Total	Total Trips Represented During Survey Period
Time Period							
Morning peak (6:00 a.m. to 9:00 a.m.)	76.9%	3.1%	37.7%	5.8%	9.1%	51.5%	34,400
Midday (9:00 a.m. to 3:00 p.m.)	23.1	96.9	62.3	94.2	90.9	48.5	32,400
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Travel Area							
East Bay	31.2%	13.1%	56.6%	32.0%	27.2%	33.2%	21,800
West Bay	27.7	24.2	18.0	23.8	32.3	25.1	16,900
Transbay	41.1	62.7	25.4	44.2	40.5	41.7	28,100
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Total Travel Time							
Under 16 minutes	4.1%	10.5%	5.7%	8.7%	8.8%	5.6%	3,700
16 to 30 minutes	25.7	42.3	18.8	24.1	26.5	25.2	16,800
31 to 45 minutes	26.9	20.3	21.5	19.3	21.3	24.5	16,400
46 to 60 minutes	27.7	13.3	23.6	24.0	19.4	25.4	17,000
Over 60 minutes	15.6	13.6	30.4	23.9	24.0	19.3	12,900
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	45.4	38.2	51.1	47.1	46.1	46.2	
Travel Time on BART							
Under 16 minutes	23.4%	34.3%	25.7%	27.5%	29.2%	25.2%	16,800
16 to 30 minutes	34.1	35.2	26.6	27.4	29.7	31.9	21,300
31 to 45 minutes	23.9	14.6	21.8	18.0	18.3	22.1	14,800
46 to 60 minutes	13.8	8.0	13.9	13.2	9.0	13.0	8,700
Over 60 minutes	4.8	7.9	12.0	13.9	13.8	7.8	5,200
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	32.3	29.5	35.7	35.7	34.2	35.2	
Travel Frequency							
5 days per week	73.5%	27.4%	57.6%	13.6%	18.3%	55.4%	37,000
3 to 4 days per week	14.1	14.3	24.2	12.2	13.9	15.1	10,100
1 to 2 days per week	5.6	18.1	12.5	23.4	18.8	10.8	7,200
Less than once per week	5.2	35.0	4.7	42.7	33.4	14.4	9,600
Trial trip	1.6	5.2	1.0	8.1	15.6	4.4	2,900
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Did you make this trip before BART was operating?							
Yes	73.2%	76.3%	65.1%	81.6%	68.9%	72.6%	48,500
No	26.8	23.7	34.9	18.4	31.1	27.4	18,300
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Previous Travel Mode							
Bus or streetcar	45.0%	23.6%	40.7%	41.5%	38.1%	42.5%	20,600
Drove alone	37.6	58.5	37.1	34.9	32.1	37.1	18,000
Car pool	15.6	13.9	19.1	20.9	26.1	17.9	8,700
Walk	0.7	2.4	1.1	2.1	2.3	1.2	600
Other	1.1	1.6	2.0	0.6	1.4	1.3	600
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Would you make this trip if BART were not operating?							
Yes	98.0%	91.3%	95.2%	95.0%	90.3%	95.9%	64,100
No	2.0	8.7	4.8	5.0	9.7	4.1	2,700
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Unweighted Sample Size:	4,805	247	993	944	1,153	8,142	
Number of Trips Represented:	39,300	2,200	8,100	7,400	9,800	66,800	
Percent of Trips Represented:	58.8%	3.3%	12.1%	11.1%	14.7%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

Table 11

BART TRIP CHARACTERISTICS ACCORDING TO TRAVEL AREA
(Total All-Day Trips Represented)

Trip Characteristic	Travel Area: East Bay	West Bay	Transbay	Total	Total All-Day Trips Represented
Time Period[a]					
Morning peak (6:00 a.m. to 9:00 a.m.)	27.3%	29.7%	28.3%	28.4%	34,400
Midday (9:00 a.m. to 3:00 p.m.)	26.7	23.9	23.7	24.7	32,400
Afternoon peak (3:00 p.m. to 7:00 p.m.)	38.3	40.7	38.9	39.2	47,600
Evening (7:00 p.m. to midnight)	7.7	5.7	9.1	7.7	10,100
Total	100.0%	100.0%	100.0%	100.0%	124,500
Trip Purpose					
Work	62.9%	72.8%	66.2%	66.8%	83,100
Business	1.0	2.3	3.7	2.4	3,000
School	18.7	7.9	7.1	11.2	13,900
Personal business	8.1	7.3	9.4	8.5	10,600
Other	9.3	9.7	13.6	11.1	13,900
Total	100.0%	100.0%	100.0%	100.0%	124,500
Total Travel Time					
Under 16 minutes	5.0%	7.5%	4.0%	5.2%	6,500
16 to 30 minutes	23.9	49.1	11.8	24.7	30,000
31 to 45 minutes	27.9	29.6	21.4	25.5	31,700
46 to 60 minutes	26.1	9.9	34.1	25.7	32,000
Over 60 minutes	17.1	3.9	28.7	18.9	23,500
Total	100.0%	100.0%	100.0%	100.0%	124,500
Average in minutes	45.8	33.6	53.7	46.3	
Travel Time on BART					
Under 16 minutes	21.7%	48.5%	9.6%	24.0%	29,900
16 to 30 minutes	35.5	42.2	24.5	32.5	40,500
31 to 45 minutes	24.9	6.1	32.0	23.0	28,600
46 to 60 minutes	11.0	1.6	22.9	13.5	16,800
Over 60 minutes	6.9	1.6	11.0	7.0	8,700
Total	100.0%	100.0%	100.0%	100.0%	124,500
Average in minutes	33.0	21.0	41.5	33.2	
Travel Frequency					
5 days per week	60.9%	69.4%	57.2%	61.3%	76,400
3 to 4 days per week	17.6	13.1	12.4	14.4	17,900
1 to 2 days per week	8.9	7.3	10.0	9.0	11,200
Less than once per week	10.2	7.6	15.3	11.7	14,600
Trial trip	2.4	2.6	5.1	3.6	4,400
Total	100.0%	100.0%	100.0%	100.0%	124,500
Did you make this trip before BART was operating?					
Yes	68.1%	79.0%	71.3%	72.2%	89,800
No	31.9	21.0	28.7	27.8	33,700
Total	100.0%	100.0%	100.0%	100.0%	124,500
Previous Travel Mode					
Bus or streetcar	25.9%	63.9%	42.6%	43.1%	38,700
Drove alone	50.9	19.4	37.7	36.8	33,000
Car pool	20.0	13.5	18.4	17.6	15,800
Walk	1.3	2.0	--	1.1	1,000
Other	1.9	1.2	1.3	1.4	1,300
Total	100.0%	100.0%	100.0%	100.0%	89,800
Would you make this trip if BART were not operating?					
Yes	96.4%	95.7%	97.0%	96.5%	120,100
No	3.6	4.3	3.0	3.5	4,400
Total	100.0%	100.0%	100.0%	100.0%	124,500
Unweighted Sample Size:	3,232	1,441	3,469	8,142	
Number of Trips Represented:	41,400	30,900	52,200	124,500	
Percent of Trips Represented:	33.3%	24.8%	41.9%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not sum to the row totals shown.

a. Percentage distributions based on all-day ridership for October 1976. See Appendix B.

Source: 1976 BART Passenger Profile Survey.

Table 12

BART TRIP CHARACTERISTICS ACCORDING TO TRAVEL AREA
(Trips Represented During 6:00 a.m. to 3:00 p.m. Survey Period)

Trip Characteristic	Travel Area: East Bay	West Bay	Transbay	Total	Total Trips Represented During Survey Period
Time Period					
Morning peak (6:00 a.m. to 9:00 a.m.)	52.3%	53.3%	49.8%	51.5%	34,400
Midday (9:00 a.m. to 3:00 p.m.)	47.7	46.7	50.1	48.5	32,400
Total	100.0%	100.0%	100.0%	100.0%	66,800
Trip Purpose					
Work	54.3%	63.7%	58.1%	58.8%	39,300
Business	1.3	3.2	5.0	3.3	2,200
School	20.6	8.6	7.4	12.1	8,100
Personal Business	11.0	10.8	12.2	11.1	7,400
Other	12.8	13.7	17.3	14.7	9,800
Total	100.0%	100.0%	100.0%	100.0%	66,800
Total Travel Time					
Under 16 minutes	5.4%	12.2%	1.9%	5.6%	3,700
16 to 30 minutes	24.8	47.1	12.6	25.2	16,800
31 to 45 minutes	26.7	26.9	21.4	24.5	16,400
46 to 60 minutes	25.4	9.4	34.8	25.4	17,000
Over 60 minutes	17.7	4.4	29.3	19.3	12,900
Total	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	45.7	32.7	54.5	46.2	
Travel Time on BART					
Under 16 minutes	23.9%	51.5%	11.2%	25.2%	16,800
16 to 30 minutes	35.2	39.0	25.5	31.9	21,300
31 to 45 minutes	23.4	5.5	30.4	22.1	14,800
46 to 60 minutes	10.2	1.6	21.7	13.0	8,700
Over 60 minutes	7.3	2.4	11.2	7.8	5,200
Total	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	32.5	20.9	40.8	33.2	
Travel Frequency					
5 days per week	55.4%	63.3%	50.6%	55.4%	37,000
3 to 4 days per week	18.4	14.4	12.8	15.1	10,100
1 to 2 days per week	10.9	9.3	11.4	10.8	7,200
Less than once per week	12.4	9.8	18.9	14.4	9,600
Trial trip	2.9	3.2	6.3	4.4	2,900
Total	100.0%	100.0%	100.0%	100.0%	66,800
Did you make this trip before BART was operating?					
Yes	68.7%	79.6%	71.4%	72.6%	48,500
No	31.3	20.4	28.6	27.4	18,300
Total	100.0%	100.0%	100.0%	100.0%	66,800
Previous Mode					
Bus or streetcar	27.0%	64.6%	40.3%	42.5%	20,600
Drove alone	49.1	19.6	39.6	37.1	18,000
Car pool	20.4	12.3	19.3	17.9	8,700
Walk	1.5	2.3	--	1.2	600
Other	2.0	1.2	0.8	1.3	600
Total	100.0%	100.0%	100.0%	100.0%	48,500
Would you make this trip if BART were not operating?					
Yes	95.6%	94.9%	96.7%	95.9%	64,100
No	4.4	5.1	3.3	4.1	2,700
Total	100.0%	100.0%	100.0%	100.0%	66,800
Unweighted Sample Size:	3,232	1,441	3,469	8,142	
Number of Trips Represented:	21,800	16,900	28,100	66,800	
Percent of Trips Represented.	32.7%	25.3%	42.0%	100.0%	

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

of all BART trips. According to Table 11, West Bay trips contain a larger percentage of work-purpose trips than either East Bay or transbay trips. Transbay trips are longest (53.7 minutes average travel time), followed by East Bay trips (45.8 minutes) and West Bay trips (33.6 minutes). People traveling in the West Bay travel more frequently and more were making the same trip before BART than East Bay and transbay travelers. West Bay trips contain the highest percentage of trips previously made by bus or streetcar (63.9%), followed by transbay (42.6%) and East Bay trips (25.9%).

Previous Mode

Table 13 compares BART trip characteristics according to the previous modes of BART travelers. Only the responses of travelers who made the same trip before BART (representing 48,500 trips) are included in the table. Among BART trips previously made by bus, more are made during the morning peak than among those previously made by automobile. BART trips previously made by bus are shorter (40.3 minutes on average) than automobile trips (47.3 minutes).

Reasons for New BART Trips

Table 14 reports the reasons new BART travelers gave for not having previously made the trip. The two predominant reasons are that the traveler moved into the area (33.7%) or the traveler started working in the area (36.1%); 8.9% of the new trips are made by people who previously lacked a means of transportation.

Table 14 suggests that BART provides proportionately greater mobility increases to young (16 to 17) and old (over 65) BART travelers compared with BART travelers in other age groups. This may be inferred from the fact that the percentage of current BART travelers who did not travel previously because they had no previous means of transport is highest for these two age groups. By similar reasoning, BART appears to provide blacks and Spanish-Americans with proportionately greater mobility increases than whites and provides people making personal business and recreational trips proportionately more mobility than people making trips for other purposes.

Access Mode to BART

Table 15 shows the characteristics of BART trips according to the traveler's access mode over the 6:00 a.m. to 3:00 p.m. survey period. Driving alone is the most used access mode during the morning peak period, and walking is the most used means of access during the off-peak period. Correspondingly, driving alone is the predominant access mode for work trips and walking is the prevailing means of access for all other trip purposes. Among BART trips using automobile as the access mode, over half

Table 13

PRESENT BART TRIP CHARACTERISTICS
ACCORDING TO PREVIOUS MODE

Trip Characteristic	Previous Mode: Bus	Drove Alone	Car Pool	Walk	Other	Total	Total Trips Represented During Survey Period[a]
Time Period							
Morning peak (6:00 a.m. to 9:00 a.m.)	53.0%	49.0%	47.6%	27.2%	59.5%	51.5%	24,400
Midday (9:00 a.m. to 3:00 p.m.)	47.0	51.0	52.4	72.8	40.5	48.5	24,100
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Trip Purpose							
Work	64.3%	61.2%	52.9%	35.4%	58.0%	59.6%	28,900
Business	2.0	5.7	2.8	7.5	4.6	3.5	1,700
School	10.5	10.9	11.7	10.7	17.7	11.1	5,400
Personal business	11.9	11.4	14.3	21.6	6.2	12.9	6,300
Other	11.3	10.8	18.3	24.8	13.5	12.9	6,300
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Travel Area							
East Bay	20.1%	42.0%	36.6%	42.7%	25.6%	31.6%	15,300
West Bay	41.3	14.4	18.8	57.3	25.3	27.4	13,300
Transbay	38.6	43.6	44.6	--	49.1	41.0	19,900
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Total Travel Time							
Under 16 minutes	9.2%	4.9%	2.6%	28.3%	7.2%	6.6%	3,200
16 to 30 minutes	33.5	22.7	20.8	33.3	21.5	27.0	13,100
31 to 45 minutes	24.3	24.8	22.7	16.7	22.7	24.1	11,700
46 to 60 minutes	21.1	27.7	27.6	8.8	17.8	24.6	11,900
Over 60 minutes	11.9	19.9	26.3	12.9	30.8	17.7	8,600
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Average in minutes	40.3	47.3	50.8	33.5	49.7	44.9	
Travel Time on BART							
Under 16 minutes	36.1%	20.3%	20.0%	62.3%	36.9%	27.7%	13,500
16 to 30 minutes	32.0	33.5	30.6	14.2	20.9	31.9	15,400
31 to 45 minutes	18.0	22.7	24.7	12.7	13.5	20.7	10,000
46 to 60 minutes	10.0	15.0	14.5	3.4	19.1	12.7	6,200
Over 60 minutes	3.9	8.5	10.2	7.4	9.6	7.0	3,400
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Average in minutes	28.2	34.9	36.1	23.9	33.2	32.2	
Would you make this trip if BART were not operating?							
Yes	95.4%	98.1%	95.3%	87.9%	91.1%	96.2%	46,700
No	4.6	1.9	4.7	12.1	8.9	3.8	1,800
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	48,500
Unweighted Sample Size:	2,422	2,297	1,040	70	77	5,906	
Number of Trips Represented:	20,600	18,000	8,700	600	600		48,500
Percent of Trips Represented:	42.5%	37.1%	17.9%	1.2%	1.3%		100.0%

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

a. Includes only the travelers who made the same type of trip before BART.

Source: 1976 Passenger Profile Survey.

Table 14

REASONS FOR NEW BART TRIPS

Traveler and Trip Characteristics	Reasons for New Trips: Moved into Area	Started Working in Area	No Previous Means of Transportation	Other Reasons	Total	Total Trips Represented During Survey Period
Sex						
Male	34.8%	33.4%	8.2%	23.6%	100.0%	8,400
Female	32.7%	38.3%	9.6%	19.4%	100.0%	9,900
Total						18,300
Age						
16 to 17	24.6%	23.6%	16.7%	35.1%	100.0%	600
18 to 24	24.4%	38.5%	11.9%	25.2%	100.0%	6,500
25 to 34	41.9%	36.2%	5.7%	16.2%	100.0%	6,500
35 to 54	38.3%	36.6%	4.7%	20.4%	100.0%	3,700
55 to 64	27.9%	35.6%	16.6%	19.9%	100.0%	700
Over 65	32.9%	12.0%	24.9%	30.2%	100.0%	300
Total						18,300
Ethnic/Racial Category						
White	33.8%	36.2%	8.0%	22.0%	100.0%	13,800
Black	36.7%	36.7%	12.9%	13.7%	100.0%	1,800
Spanish-American	25.7%	41.1%	13.8%	19.4%	100.0%	1,000
Asian	35.8%	36.2%	9.6%	18.4%	100.0%	1,400
Other	24.9%	35.2%	2.4%	37.5%	100.0%	300
Total						18,300
Travel Period						
Morning peak (6:00 a.m. to 9:00 a.m.)	40.7%	45.2%	4.8%	9.2%	100.0%	10,400
Midday (9:00 a.m. to 3:00 p.m.)	24.5%	24.2%	14.2%	37.1%	100.0%	7,900
Total						18,300
Travel Area						
East Bay	29.4%	40.3%	9.9%	20.4%	100.0%	7,100
West Bay	42.6%	34.9%	6.5%	16.0%	100.0%	3,400
Transbay	33.8%	32.8%	8.9%	24.5%	100.0%	7,800
Total						18,300
Trip Purpose						
Work	39.9%	51.1%	3.5%	5.5%	100.0%	10,900
Business	9.7%	52.6%	4.0%	33.7%	100.0%	500
School	30.5%	13.3%	14.0%	42.0%	100.0%	2,900
Personal business	31.6%	3.3%	19.6%	45.5%	100.0%	1,200
Recreation	31.6%	3.6%	24.3%	40.5%	100.0%	1,300
Other	9.1%	30.2%	12.8%	47.9%	100.0%	1,500
Total						18,300
Unweighted Sample Size:	722	851	194	469	2,236	
Total Number of Trips Represented:	6,200	6,600	1,600	3,900		18,300
Percent of Total Trips Represented:	33.7%	36.1%	8.9%	21.3%		100.0%

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 BART Passenger Profile Survey.

Table 15

BART TRIP CHARACTERISTICS ACCORDING TO ACCESS MODE

Trip Characteristic	Access Mode: Bus	Drive Alone	Car Pool	Walk	Picked Up	Other	Total	Total Trips Represented During Survey Period
Time Period								
Morning peak (6:00 a.m. to 9:00 a.m.)	45.2%	69.7%	53.1%	33.3%	70.7%	53.4%	51.5%	34,400
Midday (9:00 a.m. to 3:00 p.m.)	54.8	30.3	46.9	66.7	29.3	46.6	48.5	32,400
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Trip Purpose								
Work	50.2%	77.1%	52.8%	44.8%	72.6%	62.6%	58.8%	39,300
Business	1.3	2.1	1.3	7.2	1.4	1.7	3.3	2,200
School	18.0	7.6	3.5	14.3	9.8	15.7	12.1	8,100
Personal business	13.1	7.1	21.2	14.1	5.9	5.9	11.1	7,400
Other	17.4	6.1	21.2	19.6	10.3	14.1	14.7	9,800
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Travel Area								
East Bay	35.7%	35.1%	28.9%	31.6%	32.7%	45.9%	33.2%	21,800
West Bay	27.8	13.7	18.2	33.6	27.1	2.7	25.1	16,900
Transbay	36.5	51.2	52.9	34.8	40.2	51.4	41.7	28,100
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Access Travel Time								
Under 6 minutes	17.0%	33.6%	28.8%	43.8%	49.8%	40.9%	36.5%	24,400
6 to 10 minutes	29.4	36.9	34.9	36.1	32.6	35.6	33.8	22,600
11 to 15 minutes	22.2	16.6	18.9	9.8	10.6	13.6	15.0	10,000
16 to 20 minutes	14.0	6.3	5.6	5.2	4.4	3.5	7.1	4,700
Over 20 minutes	17.4	6.6	11.8	5.1	2.6	6.4	7.6	5,100
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	14.1	10.5	11.3	8.8	8.1	9.2	10.0	
Unweighted Sample Size:	1,523	2,491	480	2,337	1,164	147	8,142	
Number of Trips Represented:	13,400	18,400	3,800	20,200	10,000	1,000		66,800
Percent of Trips Represented:	20.1%	27.6%	5.7%	30.2%	14.9%	1.5%		100.0%

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 Passenger Profile Survey.

are transbay trips. For access times under six minutes, walking is the most frequent means of getting to the BART station, but as access times increase, travelers rely more on buses and driving alone. Access trips by bus are longer (14.1 minutes on average) than access trips by automobile (10.5 minutes) and walking access trips (8.8 minutes).

Egress Mode from BART

Table 16 compares the characteristics of BART trips according to egress mode over the 6:00 a.m. to 3:00 p.m. survey period. During both the morning peak and off-peak periods, walking is the primary means of traveling from a BART station to a destination; 88.4% of these walking egress trips take 10 minutes or less.

Origin BART Station

Tables 17 and 18 summarize BART trip characteristics according to the station of origin. Table 18 shows the high percentage of trips using "drive alone" as the means of getting to certain suburban East Bay stations, such as Lafayette, Orinda, Fremont, Union City, and Bay Fair.

Table 16

BART TRIP CHARACTERISTICS ACCORDING TO EGRESS MODE

Trip Characteristic	Egress Mode: Bus	Drive Alone	Car Pool	Walk	Picked Up	Other	Total	Total Trips Represented During Survey Period
Time Period								
Morning peak (6:00 a.m. to 9:00 a.m.)	38.3%	12.2%	23.2%	60.4%	34.6%	23.5%	51.5%	34,400
Midday (9:00 a.m. to 3:00 p.m.)	61.7	87.8	76.8	39.6	65.4	76.5	48.5	32,400
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Trip Purpose								
Work	41.3%	36.8%	31.2%	67.3%	45.3%	30.2%	58.8%	39,300
Business	1.1	6.9	1.2	3.7	4.4	6.6	3.3	2,200
School	23.4	23.0	6.8	8.4	9.5	19.5	12.1	8,100
Personal business	14.4	20.5	33.6	9.1	12.4	11.8	11.1	7,400
Other	19.8	12.8	27.2	11.5	28.4	31.9	14.7	9,800
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Travel Area								
East Bay	49.7%	33.6%	40.5%	28.2%	41.1%	48.2%	33.2%	21,800
West Bay	13.5	9.8	17.0	29.9	12.7	17.1	25.1	16,900
Transbay	36.8	56.6	42.5	41.9	46.2	34.7	41.7	28,100
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Egress Travel Time								
Under 6 minutes	17.6%	35.0%	39.5%	59.8%	34.1%	23.0%	49.1%	32,800
6 to 10 minutes	26.1	29.3	22.8	28.6	38.3	19.9	28.3	18,900
11 to 15 minutes	23.7	15.2	12.5	7.4	15.4	26.7	11.4	7,600
16 to 20 minutes	14.9	9.3	8.6	2.4	5.3	7.0	5.4	3,600
Over 20 minutes	17.7	11.2	16.6	1.8	6.9	23.4	5.8	3,900
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	66,800
Average in minutes	14.0	11.1	12.0	7.2	9.8	14.5	8.9	
Unweighted Sample Size:	1,669	326	106	5,740	220	81	8,142	
Number of Trips Represented:	13,400	3,100	900	46,800	1,900	700		66,800
Percent of Trips Represented:	20.0%	4.7%	1.4%	70.0%	2.8%	1.1%		100.0%

Note: Due to missing data, actual (weighted) responses calculated from column totals may not exactly sum to the row totals shown.

Source: 1976 Passenger Profile Survey.

Table 17

BART TRIP CHARACTERISTICS ACCORDING TO ORIGIN STATION[a]

Stations	Purpose of Travel					Total Travel Time					Frequency of Travel				
	Work	Business	School	Personal Business	Other	Under 15 Minutes	15 to 29 Minutes	30 to 44 Minutes	45 to 59 Minutes	Over 59 Minutes	Every Day	3 to 4 Days per Week	1 to 2 Days per Week	Less than Once per Week	Trial Ride[b]
Concord	79.3%	0.4%	7.2%	7.7%	5.4%	10.2%	2.0%	6.7%	16.1%	65.0%	67.7%	12.6%	4.7%	11.1%	3.9%
Pleasant Hill	85.6	0.0	3.7	5.7	5.0	7.2	0.9	7.4	29.2	55.3	70.6	12.0	5.2	11.5	0.6
Walnut Creek	74.5	1.4	6.6	7.6	9.9	12.0	1.5	9.7	27.4	49.4	59.9	11.8	3.9	19.4	5.0
Lafayette	86.8	0.0	4.8	3.6	4.8	6.0	1.6	20.6	34.8	37.0	66.5	16.2	7.0	8.3	2.0
Orinda	79.7	0.3	8.2	7.0	4.8	5.1	8.8	24.5	37.4	24.2	64.0	17.4	7.9	9.9	0.8
Rockridge	64.3	2.3	6.5	11.5	15.4	9.4	8.3	29.4	25.4	27.5	40.2	19.6	15.3	20.1	4.8
Richmond	55.8	0.5	24.7	8.1	10.9	13.5	8.3	18.5	19.2	40.5	61.7	17.7	8.9	6.0	5.7
El Cerrito del Norte	57.1	0.7	24.7	9.4	8.1	10.4	14.0	31.1	12.9	31.6	59.7	20.2	9.0	7.4	3.7
El Cerrito Plaza	57.0	0.7	20.5	13.8	8.0	17.2	22.0	27.0	12.3	21.5	56.3	21.7	7.7	13.8	0.5
North Berkeley	63.2	1.0	10.0	12.7	13.1	14.0	11.8	20.5	15.5	38.2	49.3	27.3	10.5	10.6	2.3
Berkeley	40.5	1.9	17.6	10.4	29.6	12.3	7.9	26.0	16.9	36.9	38.0	18.0	17.7	23.0	3.3
Ashby	52.5	1.8	23.9	7.2	14.6	16.5	17.1	26.5	11.0	28.9	47.2	23.8	14.9	11.2	2.9
Fremont	63.6	0.0	7.9	10.4	18.1	17.5	0.9	1.9	10.7	69.0	56.2	8.7	9.1	17.6	8.4
Union City	71.8	0.0	10.3	8.5	9.4	13.7	3.7	9.1	19.2	54.3	68.3	12.7	8.4	6.1	4.5
South Hayward	71.1	0.4	9.1	10.5	8.9	11.8	7.4	22.2	24.7	33.9	67.9	13.0	7.4	9.3	2.4
Hayward	62.9	2.4	7.9	10.7	16.0	19.3	3.8	16.9	24.9	35.1	58.8	12.1	9.7	13.1	6.3
Bay Fair	70.6	0.9	7.8	6.6	14.1	11.5	6.5	23.2	26.5	32.3	67.4	7.8	4.1	19.0	1.7
San Leandro	60.3	2.9	12.4	13.3	11.1	15.3	11.2	23.7	23.3	26.5	63.4	12.3	8.7	11.7	3.9
Coliseum	56.7	4.0	14.0	10.2	15.1	19.0	13.2	28.0	22.4	17.4	60.1	14.6	10.1	11.9	3.3
Fruitvale	64.9	0.5	13.6	9.3	11.7	13.9	16.6	27.7	19.5	22.3	54.2	18.5	14.3	9.5	3.5
Lake Merritt	58.9	4.2	11.1	3.5	22.3	21.7	14.0	31.8	14.3	18.2	61.0	14.2	11.7	9.9	3.2
MacArthur	59.5	1.5	8.9	13.7	16.4	11.9	15.3	32.1	18.9	21.8	51.9	14.9	14.4	14.9	3.9
19th Street Oakland	38.1	12.3	7.4	14.8	27.4	16.4	13.1	25.1	18.6	26.8	44.2	15.3	16.6	18.9	5.0
12th Street Oakland	42.7	5.5	9.4	25.0	17.4	23.1	14.6	22.9	9.7	29.7	44.8	22.3	14.5	14.4	4.0
Oakland West	83.6	2.5	3.1	3.1	7.7	6.7	24.6	34.0	19.4	15.3	74.2	13.1	4.4	6.5	1.8
Daly City	82.2	0.5	3.7	5.9	7.7	12.5	8.6	38.7	21.3	18.9	70.0	14.8	5.2	5.9	4.1
Balboa Park	78.1	0.4	4.9	4.6	12.0	9.9	29.0	37.1	14.5	9.5	75.0	10.0	6.3	6.1	2.6
Glen Park	84.1	1.4	3.7	7.1	3.7	13.1	37.0	36.6	4.8	8.5	72.4	15.7	5.4	5.6	0.9
24th Street Mission	59.4	1.3	10.4	16.1	12.8	18.1	36.2	26.4	9.8	9.5	62.3	13.0	11.1	7.5	6.1
16th Street Mission	62.0	1.5	10.5	12.0	13.0	22.6	35.1	18.2	7.4	16.7	58.2	16.4	12.8	8.3	4.3
Civic Center	31.7	4.3	24.1	8.4	31.5	20.2	8.6	20.6	10.8	39.8	45.6	16.6	16.6	14.4	6.8
Powell	25.2	3.0	24.0	16.8	31.0	26.0	10.3	20.6	15.4	27.7	33.3	16.3	15.0	22.0	13.4
Montgomery	39.2	28.8	11.1	2.8	18.1	14.8	19.4	24.6	9.0	32.2	47.4	13.0	16.6	18.6	4.4
Embarcadero[c]															

Note: All data effective May 1976.

a. Data are for BART travelers surveyed entering stations on the first leg of a round trip, i.e., nearly all trips are from home.
b. Travelers who do not actually use BART.
c. Embarcadero Station was not open at time of survey.

Source: 1976 BART Passenger Profile Survey.

Table 15

BART ACCESS TRIP CHARACTERISTICS ACCORDING TO ORIGIN STATION[a]

Station	Daily Patronage[b]	Entering First Leg of Trip[c]	Access Mode: Drive Alone	Car Pool	Dropped Off	Bus or Streetcar	Other[d]	Average Access Travel Time (minutes): Drive Alone	Car Pool	Dropped Off	Bus or Streetcar	Walk	Other[e]	All Modes	Percentage Distribution of Access Travel Time (all modes): Under 6 Minutes	6 to 10 Minutes	11 to 15 Minutes	16 to 20 Minutes	Over 20 Minutes	Number Connecting Bus Lines
Concord	4,547	3,033	44.7%	9.7%	22.6%	10.6%	12.4%	13.9	17.4	9.0	12.3	16.7	6.1	13.1	34.1%	30.3%	18.2%	8.6%	8.8%	3
Pleasant Hill	3,539	1,755	45.4	8.2	22.1	7.1	17.2	9.4	7.9	9.3	11.5	8.8	9.2	9.4	35.7	44.5	13.3	4.9	1.7	3
Walnut Creek	3,661	2,090	46.3	9.4	18.1	10.6	15.6	9.8	11.8	8.6	17.8	9.5	9.5	10.5	30.7	41.4	19.5	3.4	5.0	1
Lafayette	2,112	1,355	53.9	9.7	20.9	0.0	15.5	9.3	9.5	7.4	--	7.7	8.4	8.6	39.7	42.5	14.9	2.5	0.4	0
Orinda	1,869	1,278	59.9	11.1	20.1	0.6	8.3	10.6	9.5	8.2	10.0	12.8	9.6	10.1	29.5	41.8	22.0	4.2	2.5	0
Rockridge	1,997	1,118	36.3	6.2	8.3	22.4	26.8	8.0	14.3	7.8	13.0	9.5	6.4	9.8	41.6	36.3	12.6	6.4	3.2	4
Richmond	1,513	811	27.9	5.3	16.5	24.3	26.0	16.7	20.7	8.1	17.5	12.0	13.4	14.7	36.7	26.8	11.6	9.9	15.0	4
El Cerrito del Norte	1,938	1,358	46.2	10.3	11.1	11.4	19.0	13.6	8.8	6.9	15.4	9.2	5.0	11.7	44.8	25.6	14.9	8.0	6.8	8
El Cerrito Plaza	1,332	1,042	29.5	4.8	9.4	12.7	43.6	6.7	6.0	8.0	12.5	8.7	5.9	8.4	54.8	27.1	12.2	3.1	2.8	6
North Berkeley	1,683	1,013	30.2	2.7	9.2	10.0	47.9	8.1	5.4	5.5	10.5	7.6	4.4	7.6	53.1	32.2	9.5	4.0	1.2	6
Berkeley	5,629	1,603	4.3	0.0	4.5	33.3	57.9	8.8	--	14.9	12.3	10.0	9.8	10.8	43.8	28.5	15.9	7.0	4.8	11
Ashby	1,409	752	20.9	5.1	9.7	12.1	52.2	9.4	9.5	8.8	15.2	7.7	7.9	9.2	55.4	23.0	11.1	5.1	5.4	4
Fremont	3,439	2,019	50.7	12.4	12.3	18.5	6.1	14.0	18.5	12.9	23.9	9.7	6.7	16.0	34.8	20.2	13.6	9.3	22.2	9
Union City	2,367	1,455	56.1	7.6	12.6	15.3	8.4	9.1	12.7	7.7	13.8	11.1	10.7	10.1	32.3	43.4	16.2	6.8	3.3	2
South Hayward	1,950	1,094	45.3	6.5	22.9	7.7	17.6	7.4	11.3	6.0	15.9	12.1	8.7	8.6	57.4	27.4	9.6	0.4	5.1	2
Hayward	3,411	1,604	45.3	6.0	15.6	22.0	20.1	11.1	24.2	8.4	19.9	14.7	4.7	13.6	32.7	34.6	13.4	6.8	12.5	14
Bay Fair	2,685	1,742	50.6	11.4	14.8	14.2	9.0	11.0	15.5	8.6	22.2	11.5	--	12.9	41.4	31.1	8.2	5.2	14.1	5
San Leandro	2,204	1,079	41.6	8.6	16.5	16.5	16.8	7.0	8.5	10.8	13.5	12.5	5.7	9.6	44.9	34.2	12.1	2.8	6.0	8
Coliseum	2,020	880	34.1	3.4	13.8	33.8	14.9	8.6	7.6	8.4	13.9	10.3	6.2	10.4	46.8	28.2	12.2	6.8	6.0	3
Fruitvale	2,902	1,433	42.2	4.4	11.9	27.8	13.7	9.0	6.0	12.4	10.6	9.3	5.0	9.7	43.7	31.9	16.3	4.5	3.7	12
Lake Merritt	3,281	1,078	28.2	5.7	17.9	10.3	37.9	11.2	12.7	12.8	21.5	6.5	6.8	10.8	41.1	34.6	11.9	4.3	8.1	6
MacArthur	2,016	1,033	37.6	5.1	13.1	18.6	25.6	10.6	12.5	11.8	13.2	7.5	5.0	10.5	39.3	35.6	13.1	6.4	5.6	8
19th Street Oakland	5,533	1,244	11.5	4.2	8.2	27.6	48.5	10.4	17.2	19.7	13.9	7.3	--	10.7	47.7	24.6	15.7	4.7	7.2	19
12th Street Oakland	4,632	1,024	7.5	0.9	5.2	56.0	30.4	12.5	--	7.4	12.6	4.9	--	10.8	46.8	27.5	13.5	4.7	7.5	29
Oakland West	1,824	945	59.1	10.7	14.9	4.8	10.5	15.2	16.0	16.2	14.3	7.4	5.0	14.6	29.1	31.6	17.1	5.8	16.3	3
Daly City	8,084	4,615	21.8	6.6	27.3	31.0	13.3	12.2	13.6	9.4	17.6	12.1	--	13.2	24.3	36.8	17.8	13.0	8.0	9
Balboa Park	4,482	2,325	25.3	6.9	23.1	11.5	33.2	12.4	13.1	6.5	9.5	8.7	--	9.5	37.3	42.3	12.5	4.8	3.1	6
Glen Park	3,612	2,654	22.8	4.5	21.5	18.5	32.7	7.6	7.2	6.8	10.1	7.5	--	7.8	53.6	34.2	8.9	3.2	0.0	3
24th Street Mission	3,210	1,533	5.2	2.2	11.8	18.1	62.7	9.7	4.7	10.3	13.3	6.9	5.0	8.6	55.1	29.1	8.7	4.5	2.7	9
16th Street Mission	2,281	1,075	6.8	1.3	10.6	16.4	64.9	7.2	3.0	9.4	12.3	8.3	--	9.3	52.6	31.1	8.8	2.2	5.3	9
Civic Center	7,607	1,433	5.3	0.8	2.8	42.6	48.5	8.6	10.0	13.2	20.0	8.4	15.0	13.7	42.9	24.5	7.2	11.7	13.8	23
Powell	11,031	2,081	3.2	1.0	4.5	48.5	42.8	12.4	41.7	12.8	17.7	11.1	44.0	15.5	38.6	19.8	15.9	11.3	14.3	28
Montgomery	16,237	1,388	3.9	1.5	5.6	28.0	61.0	11.2	6.5	17.3	20.3	6.3	21.9	11.3	50.8	18.9	13.2	7.4	9.7	51
Embarcadero[f]	9,486																			41

Note: All data effective May 1976 except BART Patronage and Number of Connecting Bus Lines data which are effective February 1977.

a. Data are for BART travelers surveyed entering stations on the first leg of a round trip; i.e., nearly all trips are from home.
b. The total number of people entering the BART station for a typical day, February 1977.
c. The number of BART travelers entering the BART station from 6:00 a.m. to 3:00 p.m. and from 7:00 p.m. to midnight who were making the first leg of a round trip.
d. "Other" includes bicycle, motorcycle, and walking. Walk trips comprise 25.2% of access trips while bicycle and motorcycle trips comprise 1.6% of access trips.
e. "Other" includes bicycle and motorcycle.
f. The Embarcadero Station was not open at time of survey.

Sources: 1976 BART Passenger Profile Survey.
BARTD Department of Planning and Research.
"BART & Buses"--A map guide of the San Francisco/Daly City area showing BART and connecting bus routes.
"BART & Buses"--A map guide of the East Bay showing BART and connecting bus routes.
SamTrans bus schedule for Daly City services.

VI. SOCIOECONOMIC CHARACTERISTICS OF AREAWIDE TRAVELERS

The 1975 population of the area covered in the May 1975 Areawide Travel Survey is estimated at 2,574,000 persons. Of these, 1,878,000 are aged 16 years or older. This estimated adult population was taken as the total traveler population for the areawide travel survey and is used as the basis for the data and analyses presented in this report.

According to the May 1975 Areawide Travel Survey, the traveler population in the BART service area makes about 33.4 million trips per week by transit, private automobile, or other vehicles. Some 24.7 million (84%) of these are made on the five weekdays combined and 8.7 million (26%) on Saturday and Sunday. (These figures represent trip-making rates of 2.63 trips per person per day on weekdays and 2.32 trips per person per day on weekends.)

Table 19 compares socioeconomic characteristics of travelers making BART trips with the characteristics of travelers making trips as automobile drivers, automobile passengers, and by bus or streetcar. The table shows total estimated trips made per seven-day week.

BART Travelers Compared to Automobile Travelers

Comparing the characteristics of travelers making BART trips with those making trips as automobile drivers shows a similar distribution between males and females (about 55% male and 45% female). However, according to Table 19, the typical BART traveler is younger, more likely to be nonwhite, and has a higher family income than the typical automobile driver. Among trips made as automobile passengers, a much lower proportion are made by males (25%) than females (75%) compared to either BART or automobile-driver trips. Automobile passengers also tend to be rather older and have lower family incomes than drivers or BART riders.

BART Travelers Compared to Bus Travelers

The survey results presented in Table 19 show a slightly higher proportion of BART trips are made by males than are made by females, while bus trips are made by about equal numbers of males and females. Comparing the age distributions of BART and bus travelers* shows that a higher percentage of BART travelers are in the 25-to-44 age group with correspondingly lower percentages in the under-25 and over-44 groups.

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*In the remainder of the discussion it is assumed that the population of travelers and the population of people making trips (which are different to the extent that some people make more trips than others) have similar characteristics. Consequently the terms "traveler" and "trip-maker" are used synonymously.

Table 19

SOCIOECONOMIC CHARACTERISTICS OF PEOPLE MAKING TRIPS ACCORDING TO TRAVEL MODE
(Total Trips Made in Vehicles per Seven-Day Week, May 1975)

Socioeconomic Characteristic	BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total
Sex					
Male	53.5%	55.4%	24.5%	49.9%	49.8%
Female	46.5	44.6	75.5	50.1	50.2
	100.0%	100.0%	100.0%	100.0%	100.0%
Age					
Under 25	26.8%	22.7%	32.7%	33.4%	32.7%
25 to 44	49.5	43.6	29.1	29.7	49.9
Over 44	23.7	33.7	38.2	36.9	17.4
	100.0%	100.0%	100.0%	100.0%	100.0%
Annual Family Income					
Under $10,000	29.9%	28.5%	36.1%	57.2%	32.8%
$10,000 to $20,000	37.0	50.0	48.3	34.6	47.8
Over $20,000	33.1	21.5	15.7	8.2	19.4
	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnic/Racial Category[b]					
White	72.2%	87.5%	84.7%	75.2%	85.5%
Black	9.6	7.9	8.0	13.7	8.5
Other	18.2	4.6	7.3	11.1	6.0
	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Trips Represented:	588,000[c]	23,912,000	5,365,000	3,537,000	33,402,000
Percent of Trips Represented:	1.8%	71.5%	16.1%	10.6%	100.0%
Unweighted Sample Size:	9,698[d]	1,558[e]	415[e]	237[e]	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles.
b. BART data are weighted to account for differential response rates by ethnic category using weighting factors derived for 1976 Passenger Profile Survey.
c. Average number of weekly BART trips, May 1975.
d. Represents the number of trips made by respondents to the 1975 BART Passenger Profile Survey.
e. Represents the number of trips made by respondents to the 1975 Areawide Travel Survey.

Sources: BART Impact Program, May 1975 Areawide Travel Survey (for automobile and bus trips).
1975 BART Passenger Profile Survey (for BART trips).

According to Table 19, BART trips are typically made by people having considerably higher incomes than those traveling by bus. Relative to bus trips, BART trips are also apparently made by smaller percentages of whites and blacks but by a larger percentage of people in the "other" ethnic category.

VII. BART'S SHARE OF WEEKDAY TRIPS

This section analyzes BART's share of areawide trips made Monday through Friday based on results of the May 1975 Areawide Travel Survey. (BART did not provide regular Saturday and Sunday service during 1975.) BART's share of a number of trip "markets" is considered.

Work Trips Made in the BART Service Area

For the reasons outlined in Chapter II, the areawide telephone survey underrepresents the number of trips made to and from work in the BART service area. To gauge the extent of this underrepresentation, an estimate of the total number of work trips was made from 1970 U.S. Census data and 1975 ABAG Provisional Series 3 population projections as follows: The total 1975 population (aged 16 years and older) of the BART service area is estimated as 1,878,000. Of these, 60% or 1,123,000 are employed, and of these workers 83% or 934,000 usually travel to work by some form of vehicle (automobile, truck, bus, streetcar, or train). The remaining 17% of workers usually work at home, walk to work, or use some other mode of transport.

In estimating the number of work trips made by these workers, the following assumptions are made: (1) the typical worker is assumed to work a standard five-day week (i.e., the number of workers working less than five days is offset by the number of those working six or seven days); (2) the typical worker is assumed to go to work by his usual method on 230 days a year (i.e., on 30 of the approximately 260 work days in the year he takes holidays, vacation, and sick leave, works at home, or does not make a work trip for other reasons); (3) on each day he goes to work he makes two work trips. These three assumptions give an estimated 460 work trips per worker per year, or a total of about 429 million work trips per year.

The areawide telephone survey results suggest that 88% of work trips are made on weekdays, giving an estimated total of about 379 million weekday work trips annually. This is equivalent to 1,458,000 work trips per typical weekday, or 7,289,000 per typical Monday-through-Friday period.

The 7,289,000 trip estimate may be compared with the corresponding estimate of 5,891,000 weekly trips derived directly from the areawide telephone survey, suggesting about a 20% underrepresentation of work trips in the telephone survey. To compensate, in the remainder of this report the 7,289,000 work-trip total is used as a control total, with the areawide telephone survey results being used to estimate the distribution of trip characteristics within this total.

BART's Share of Weekday Trips According to Trip Purpose

Table 20 shows total weekday trips in the BART service area, distributed by mode (BART, automobile driver, automobile passenger, and bus or streetcar) and by trip purpose (work, business, school, shopping, and other).

Overall, BART's share of total weekday trips is by far the smallest of the four modes: about 588,000 trips per week or approximately 2.4% of the total 24,680,000 trips made on all modes. About 10.6% of total trips are made on bus or streetcar, and the remaining 87.0% by automobile (and other vehicle modes).

When total weekday trips in the BART service area are stratified by trip purpose, BART's largest share is for trips to and from work (5.2% of all work trips).* Its second largest share is 2.9% of school or college trips, followed by 1.9% of business trips. BART carries a negligible share (less than 1%) of shopping or other-purpose trips.

BART's Share of Weekday Trips According to Trip Start Time

Table 21 shows weekday vehicle trips in the BART service area, distributed by mode and start time, and Table 22 gives trips by purpose and start time. Both tables correlate with data given in Table 20, showing that BART's largest share of travel is for trips made to or from work (in the peak period), and its smallest share is for trips in the shopping and other-purpose categories (in the off-peak).

As shown on Table 21, BART's share of trips varies according to the time the trip starts. BART captures its largest share (5.4%) of total trips during the 7:00 a.m. to 9:00 a.m. period and its second largest share

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*Preliminary results of the Census Bureau's 1975 Annual Housing Survey (AHS) Travel to Work Supplement for the three BART District Counties show that an estimated 3.8% of the workers in the three BARTD counties who travel to work by automobile, truck, or public transit usually go to work by BART ("railroad, subway, or elevated"). Given that BART does not operate on weekends, this result is equivalent to the estimate that about 4.3% of weekday work trips are usually made by BART. The difference between this 4.3% estimate and the 5.2% estimate given in Table 20 may be explained by a number of factors including: (1) the preliminary nature of the AHS survey results (data are for about one-third the number of cases in the entire sample, and are not fully edited); (2) possible sampling errors; (3) differences in the way workers and modes were defined in the AHS and areawide telephone surveys; and (4) the slightly different areas covered in the two surveys. Bearing these uncertainties in mind, the 4.3% AHS estimate can probably be regarded as a reasonable verification of the estimate given in Table 20 for the percentage of work trips made by BART.

Table 20

MODE AND PURPOSE OF TRAVEL
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Trip Purpose	Mode of Travel: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Work	381,000 5.2%	4,779,000 65.6%	838,000 11.5%	1,291,000 17.7%	7,289,000 100.0%
Business	33,000 1.9%	1,462,000 86.2%	108,000 6.4%	93,000 5.5%	1,696,000 100.0%
School or College	77,000 2.9%	1,798,000 66.2%	325,000 12.3%	494,000 18.6%	2,654,000 100.0%
Shopping	29,000 0.6%	3,788,000 78.5%	777,000 16.1%	230,000 4.8%	4,824,000 100.0%
Other Purposes[b]	68,000 0.8%	5,926,000 72.1%	1,702,000 20.7%	521,000 6.4%	8,217,000 100.0%
Number of Trips Represented	588,000[c]	17,713,000	3,750,000	2,629,000	24,680,000
Percent of Trips Represented	2.4%	71.8%	15.2%	10.6%	100.0%
Unweighted Sample Size:	9,698	1,183	262	192	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 834,000 weekday trips per week are made by these modes.
b. The other-purposes category includes recreation trips, trips to visit friends or relatives, and personal business trips.
c. Average number of weekday BART trips, May 1975.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1975 BART Passenger Profile Survey.

Table 21

MODE OF TRAVEL AND TRIP START TIME
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Trip Start Time	Mode of Travel: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Midnight to 6:59 a.m.	31,000 2.7%	691,000 61.2%	202,000 17.9%	205,000 18.2%	1,129,000 100.0%
7:00 a.m. to 8:59 a.m.	159,000 5.4%	1,842,000 62.9%	450,000 15.4%	476,000 16.3%	2,927,000 100.0%
9:00 a.m. to 11:59 a.m.	87,000 2.0%	3,295,000 76.2%	577,000 13.4%	363,000 8.4%	4,322,000 100.0%
Noon to 2:59 p.m.	91,000 1.7%	4,304,000 80.0%	574,000 10.6%	413,000 7.7%	5,382,000 100.0%
3:00 p.m. to 5:59 p.m.	191,000 3.1%	4,092,000 66.2%	998,000 16.1%	904,000 14.6%	6,185,000 100.0%
6:00 p.m. to Midnight	29,000 0.6%	3,489,000 73.7%	949,000 20.0%	268,000 5.7%	4,735,000 100.0%
Number of Trips Represented:	588,000[b]	17,713,000	3,750,000	2,629,000	24,680,000
Percent of Trips Represented:	2.4%	71.8%	15.2%	10.6%	100.0%
Unweighted Sample Size:	8,142	1,183	262	192	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 834,000 weekday trips per week are made by these modes.
b. Average number of weekday BART trips, May 1975.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey, adjusted to reflect May 1975 BART service hours.

Table 22

TRIP PURPOSE AND TRIP START TIME
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Trip Start Time	Purpose of Travel: To or From Work	Business	School or College	Shopping	Other Purposes[a]	Total All Purposes[b]
Midnight to 6:59 a.m.	910,000 72.4%	8,000 0.6%	*	9,000 0.7%	330,000 26.3%	1,257,000 100.0%
7:00 a.m. to 8:59 a.m.	1,876,000 60.5%	114,000 3.7%	729,000 23.5%	111,000 3.6%	270,000 8.7%	3,100,000 100.0%
9:00 a.m. to 11:59 a.m.	690,000 15.4%	583,000 13.0%	462,000 10.3%	1,080,000 24.1%	1,668,000 37.2%	4,483,000 100.0%
Noon to 2:59 p.m.	632,000 12.5%	426,000 8.4%	714,000 14.1%	1,535,000 30.2%	1,767,000 34.8%	5,074,000 100.0%
3:00 p.m. to 5:59 p.m.	2,377,000 37.8%	401,000 6.4%	436,000 7.0%	1,365,000 21.7%	1,702,000 27.1%	6,281,000 100.0%
6:00 p.m. to Midnight	804,000 17.9%	164,000 3.7%	313,000 7.0%	724,000 16.1%	2,480,000 55.3%	4,485,000 100.0%
Number of Trips Represented:	7,289,000	1,696,000	2,654,000	4,824,000	8,217,000	24,680,000
Percent of Trips Represented:	29.5%	6.9%	10.7%	19.6%	33.3%	100.0%
Unweighted Sample Size:	405	142	163	405	616	

Note: Asterisk means negligible.

a. The other-purposes category includes recreation trips, trips to visit friends or relatives, and personal business trips.
b. Due to missing data, the total number of trips for all purposes do not exactly equal the total number for all modes (Table 21) in each category.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey, adjusted to reflect May 1975 BART service hours.

(3.1%) between 3:00 p.m. and 6:00 p.m. As expected, Table 22 shows that these periods are dominated by work-purpose trips. In contrast, BART's smallest share (0.6%) of areawide weekday trips occurs after 6:00 p.m., and its second smallest share is between noon and 3:00 p.m. According to Table 22, shopping and other-purpose trips dominate these two periods.

BART's Share of Weekday Trips as a Function of Distance from BART

The total urbanized area within the BART service area is about 330 square miles, but less than one-third of the urbanized area is within one mile of any of the 33 BART stations operating at the time of the survey.

The areawide survey shows that 29.6% of all weekday trips in the BART service area are made by people who reside within one mile of a BART station. Of the trips made by these residents, 6.0% are on BART. The survey also shows that 12.8% of weekday trips in the service area are made by people who reside within one-half mile of a BART station, and 8.7% of these are made on BART.

Not surprisingly, these figures imply that the closer people live to BART, the more likely they are to use it. But of course, many other variables--some of which may be correlated with distance of residence from BART (e.g., income level)--influence an individual's modal choice.

BART's Share of Weekday Trips According to Time Spent Traveling

Table 23 distributes weekday vehicle trips in the BART service area by mode and the amount of time the trips require. Table 24 provides more detail on travel time by distributing trips according to purpose of travel and travel time.

As trip times increase, so does BART's share of total areawide travel. For trips under 16 minutes, BART carries a negligible 0.2% of trips represented by the survey, but when trip time increases to between 56 and 75 minutes, BART accounts for 13.2% of areawide trips, and climbs to 20.0% for trips taking longer than 75 minutes. (Of course, the total number of these very long trips is small.) Similarly, buses and streetcars tend to have their highest shares for long trips, while automobile's share is highest for short trips.

Although not shown by Table 24, most of the very long trips made on BART are trips to or from work, school, or college.

Table 23

MODE OF TRAVEL AND TIME SPENT TRAVELING
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Time Spent Traveling	Mode of Travel: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Less than 16 minutes	32,000 0.2%	11,584,000 82.0%	1,826,000 12.9%	694,000 4.9%	14,136,000 100.0%
16 to 35 minutes	178,000 2.3%	4,783,000 62.7%	1,290,000 16.9%	1,377,000 18.1%	7,628,000 100.0%
36 to 55 minutes	166,000 11.2%	602,000 40.6%	435,000 29.4%	279,000 18.8%	1,482,000 100.0%
56 to 75 minutes	144,000 13.2%	567,000 51.8%	113,000 10.3%	271,000 24.7%	1,095,000 100.0%
More than 75 minutes	68,000 20.0%	177,000 52.2%	86,000 25.4%	8,000 2.4%	339,000 100.0%
Number of Trips Represented:	588,000[b]	17,713,000	3,750,000	2,629,000	24,680,000
Percent of Trips Represented:	2.4%	71.8%	15.2%	10.6%	100.0%
Unweighted Sample Size:	8,142	1,183	262	192	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 834,000 weekday trips per week are made by these modes.
b. Average number of weekday BART trips, May 1975.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey, adjusted to reflect May 1975 BART service hours.

Table 24

TRIP PURPOSE AND TIME SPENT TRAVELING
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Time Spent Traveling	Purpose of Travel: To or From Work	Business	School or College	Shopping	Other Purposes[a]	Total All Purposes[b]
Less than 16 minutes	3,102,000 22.1%	958,000 6.8%	1,545,000 11.0%	3,585,000 25.6%	4,831,000 34.5%	14,021,000 100.0%
16 to 35 minutes	3,213,000 41.9%	558,000 7.3%	764,000 10.0%	868,000 11.3%	2,260,000 29.5%	7,663,000 100.0%
36 to 55 minutes	622,000 40.1%	51,000 3.3%	207,000 13.4%	217,000 14.0%	452,000 29.2%	1,549,000 100.0%
56 to 75 minutes	316,000 29.0%	129,000 16.8%	138,000 12.6%	82,000 7.5%	427,000 39.1%	1,092,000 100.0%
More than 75 minutes	36,000 10.1%	*	*	72,000 20.3%	247,000 69.6%	355,000 100.0%
Number of Trips Represented:	7,289,000	1,696,000	2,654,000	4,824,000	8,217,000	24,680,000
Percent of Trips Represented:	29.5%	6.9%	10.7%	19.6%	33.3%	100.0%
Unweighted Sample Size:[c]	407	142	163	405	616	

Note: Asterisk means negligible.

a. The other-purposes category includes recreation trips, trips to visit friends or relatives, and business trips.
b. Due to missing data, the total number of trips for all purposes may not equal the total number of trips for all modes (Table 23) in each category.
c. Sample sizes are for the Areawide Travel Survey alone.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey, adjusted to reflect May 1975 BART service hours.

VIII. BART'S SHARE OF WEEKDAY WORK TRIPS

As described in the previous chapter, BART's largest share of total weekday travel is for work purposes. This chapter provides a more detailed description of BART's impacts in this travel market.

BART's Share of Weekday Trips According to Travel Time

Table 25 shows work-trip mode distributed by the time the trip takes. As with trips for all purposes (see Table 23), BART's share of work trips is largest for long trips and smallest for short trips. Of work trips taking 35 minutes or less, BART's share is 2.1%, bus' share is 15.0%, and automobile's share is 82.9%. Of work trips in the 36- to 55-minute range, BART's share is 20.3%, compared to 37.7% made by bus and 42.0% by automobile. Of work trips having a travel time of more than 55 minutes, BART's share rises to 38.3%, with virtually all the very long trips (more than 75 minutes) being made by BART. Of course, as shown in the table, the total number of work trips in the long travel time categories is relatively small.

BART's Share of Weekday Work Trips as a Function of Distance from BART

The May 1975 survey shows that of all trips made to and from work in the BART service area, 36.6% are made by people who live one mile or less from a BART station. Of work trips made by these residents, 10.2% are made by BART. People who live within one-half mile of a BART station account for 16.4% of all work trips in the BART service area. Of work trips made by these people, 15.7% are on BART.

BART's Share of Weekday Work Trips According to the Trip Start Time

Table 26 shows starting times for work trips and how these trips are distributed by mode. As shown, BART captures its largest share of trips during the 7:00 a.m. to 9:00 a.m. morning peak (6.6% of all trips made during the period) and the 3:00 p.m. to 6:00 p.m. afternoon peak (7.1% of the trips). Bus' shares of trips are also highest in the morning and evening peak periods; automobile's share is highest in the off-peak. It is interesting to note how many trips to and from work are made outside the morning and evening peak periods.

BART's Share of Weekday Work Trips According to City of Workplace

Table 27 shows BART's share of work trips made to the cities of San Francisco, Oakland, Berkeley, and others (combined). Over half (51.4%) of all work trips made on BART are to or from workplaces in San Francisco.

Table 25

WORK TRIP MODE AND TIME SPENT TRAVELING
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Time Spent Traveling	Work Trip Mode: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Less than 16 minutes	16,000 0.5%	2,456,000 78.3%	346,000 11.0%	321,000 10.2%	3,189,000 100.0%
16 to 35 minutes	119,000 3.7%	2,070,000 64.2%	407,000 12.6%	630,000 19.5%	3,226,000 100.0%
36 to 55 minutes	122,000 20.3%	167,000 27.8%	85,000 14.2%	226,000 37.7%	600,000 100.0%
56 to 75 minutes	95,000 32.2%	86,000 29.2%	*	114,000 38.6%	295,000 100.0%
More than 75 minutes	29,000 100.0%	*	*	*	29,000 100.0%
Number of Trips Represented:	381,000	4,779,000	838,000	1,291,000	7,289,000
Percent of Trips Represented:	5.2%	65.6%	11.5%	17.7%	100.0%
Unweighted Sample Size:	4,787	246	22	73	

Note: Asterisk means negligible.

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 240,000 weekday trips per week are made by these modes.

Sources: BART Impact Program May 1975 Areawide Travel Survey and 1976 BART Passenger Profile Survey.

Table 26

WORK TRIP MODE AND START TIME
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Work Trip Start Time	Work Trip Mode: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Midnight to 6:59 a.m.	44,000 4.8%	545,000 59.8%	89,000 9.8%	233,000 25.6%	911,000 100.0%
7:00 a.m. to 8:59 a.m.	124,000 6.6%	1,152,000 61.6%	271,000 14.5%	323,000 17.3%	1,870,000 100.0%
9:00 a.m. to 11:59 a.m.	21,000 3.0%	541,000 77.9%	55,000 7.9%	78,000 11.2%	695,000 100.0%
Noon to 2:59 a.m.	14,000 2.2%	530,000 83.3%	31,000 4.9%	61,000 9.6%	636,000 100.0%
3:00 p.m. to 5:59 p.m.	168,000 7.1%	1,294,000 54.7%	367,000 15.5%	536,000 22.7%	2,365,000 100.0%
6:00 p.m. to Midnight	10,000 1.2%	717,000 88.3%	25,000 3.1%	60,000 7.4%	812,000 100.0%
Number of Trips Represented:	381,000	4,779,000	838,000	1,291,000	7,289,000
Percent of Trips Represented:	5.2%	65.6%	11.5%	17.7%	100.0%
Unweighted Sample Size:	4,787	246	22	73	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 240,000 weekday trips per week are made in these modes.

Sources: BART Impact Program May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey.

Table 27

WORK TRIP MODE AND LOCATION OF WORKPLACE
(Total Trips Made in Vehicles Monday through Friday, May 1975)

Location of Workplace	Work Trip Mode: BART	Automobile Driver[a]	Automobile Passenger	Bus or Streetcar	Total All Modes
Berkeley	52,000 7.4%	534,000 75.4%	73,000 10.3%	49,000 6.9%	708,000 100.0%
Oakland	67,000 5.8%	795,000 68.4%	138,000 11.9%	162,000 14.9%	1,162,000 100.0%
San Francisco	196,000 6.9%	1,315,000 46.1%	544,000 19.1%	795,000 27.9%	2,850,000 100.0%
Other	66,000 2.6%	2,135,000 83.1%	83,000 3.2%	285,000 11.1%	2,569,000 100.0%
Number of Trips Represented:	381,000	4,779,000	838,000	1,291,000	7,289,000
Percent of Trips Represented:	5.2%	65.6%	11.5%	17.7%	100.0%
Unweighted Sample Size:	4,787	246	22	73	

a. Includes "other" modes, largely pickup trucks and other commercial vehicles. A total of 240,000 weekday trips are made by these modes.

Sources: May 1975 Areawide Travel Survey.
1976 BART Passenger Profile Survey.

These BART trips represent a 6.9% share of all San Francisco work trips. The 67,000 daily work trips made to Oakland by BART represent 17.6% of all BART work trips and a 5.8% share of all work trips made to or from workplaces in Oakland. The 52,000 daily work trips to Berkeley by BART represent 13.6% of all BART work trips and a 7.4% share of all trips to or from Berkeley workplaces.

IX. POTENTIAL BART TRIPS

The previous two chapters consider BART's share of various "trip markets" defined by the number of trips made throughout the May 1975 areawide survey sampling area. However, this "service area" includes many parts of the Bay Area to which BART effectively provides very little service. Thus, the numbers given understate BART's share of trips it could reasonably serve. This chapter considers BART's share of those areawide trips which potentially could have used BART at the time of the survey.

To define "potential" BART trips, the May 1975 survey asked respondents to describe all their vehicle trips on the day before the survey. For each trip not made on BART, the survey simply asked, "Could you have taken BART?" (yes or no). If the respondent answered "yes," the trip is counted as a potential BART trip.

According to the survey results, 2.4% of the 24,680,000 trips made on weekdays (588,000) are made on BART and 8.8% of all weekday trips (2,176,000) can be made on BART but are not. Therefore, 11.2% or 2,764,000 trips in total are or can be made by BART on weekdays. Taking this total as BART's maximum weekday travel market, BART realized 21.3% of its maximum travel market in May 1975.

The total potential travel market is defined here by travelers' perceptions of the feasibility of using BART for particular trips. These perceptions probably vary greatly among travelers, so that the resulting definition of the travel market is largely arbitrary. Accordingly, the estimate of potential market share should be viewed only as a general indicator of BART's share of travel. Nevertheless, it is interesting to compare the 21.3% estimate with the 2.4% estimate given in Table 20.

Potential BART trips for the evening travel market (8:00 p.m. to midnight) and the weekend travel market are excluded from the above estimates. To estimate the likelihood of people using BART during evenings and weekends, the May 1975 areawide survey asked respondents who use BART or have tried BART (57.2% of all respondents), "Would you use BART more regularly if it operated during the evenings?" and "Would you use BART on a regular basis if it operated on weekends?" The survey results show that 49.1% answered "yes" about evening service, and 67.2% answered "yes" about weekend service.

X. ATTITUDES TOWARD BART

The May 1975 survey asked travelers to rate their satisfaction with and perceptions of certain BART service characteristics. Specifically, the survey asked about satisfaction with trip cost, station parking space availability, safety, and security;* and about their perceptions of the level of rush-hour crowding and reliability.** This chapter presents the resultant ratings by trip purpose and mode. It also summarizes the reasons why some travelers have reduced their use of BART.

BART Satisfaction and Perceptions Stratified by Trip Purpose and Mode

Table 28 summarizes average satisfaction ratings for cost, parking availability, safety, and security as given by (1) respondents making work trips,*** (2) respondents making trips for nonwork purposes,*** (3) BART riders, (4) bus and streetcar riders, (5) automobile drivers, and (6) automobile passengers. Table 29 summarizes average perception ratings of BART's crowding and reliability stratified by the same six groups of travelers.

Comparing the average ratings between the work and nonwork travelers, work travelers are slightly more satisfied with BART's cost than nonwork travelers. However, both work and nonwork travelers are mostly satisfied with BART's total travel cost, safety, and security. With regard to parking space availability, both groups of respondents are split about evenly between those who are satisfied and those who are dissatisfied.

As shown in Table 29, both groups also give similar average perception ratings, ranking BART as very crowded to crowded and as reliable to very reliable. In light of BART's widely held reputation for unreliability, the latter result is surprising and may be explained by the fact that the questionnaire wording (especially when read over the telephone) may have put relatively little emphasis on the "on time" part of the question "How reliable do you think BART is to get you where you are going on time?"

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*In the survey questionnaire, these characteristics were defined as "Total cost of BART trip," "Ability to find a place to park at the BART station," "Safety from accident or injury on BART," and "Security from crime and unpleasant behavior of other people on BART."

**In the questionnaire, the questions were: "How crowded do you think the BART trains are during the rush hour?" and "How reliable do you think BART is to get you where you are going on time?"

***The ratings of respondents making trips for both work and nonwork purposes on the survey day are excluded from the average.

Table 28

SATISFACTION WITH BART COST, PARKING AVAILABILITY, SAFETY, AND SECURITY

Traveler Group	Average Satisfaction Ratings[a]				Unweighted Sample Size
	Total Travel Cost	Station Parking Availability	Safety from Injury	Security from Crime	
Work Tripmakers	2.6	2.0	2.5	2.7	83
Nonwork Tripmakers	2.4	2.1	2.5	2.6	279
BART Riders	2.6	2.1	2.6	2.7	25
Bus and Streetcar Riders	2.5	2.0	2.6	2.6	69
Automobile Drivers	2.4	2.2	2.5	2.6	292
Automobile Passengers	2.4	1.9	2.5	2.6	60

a. Based on a rating scale of: 1 = very dissatisfied.
2 = neutral.
3 = very satisfied.

Source: May 1975 Areawide Travel Survey.

Table 29

PERCEPTIONS OF BART CROWDING AND RELIABILITY

Traveler Group	Average Perception Rating[a] Rush-Hour Crowding	On-Time Reliability	Unweighted Sample Size
Work Tripmakers	1.6	3.3	88
Nonwork Tripmakers	1.7	3.3	274
BART Riders	1.4	3.6	26
Bus and Streetcar Riders	1.7	3.3	81
Automobile Drivers	1.6	3.1	279
Automobile Passengers	1.8	3.5	55

a. Based on a rating scale of: 1 = very crowded (very unreliable).
2 = crowded (unreliable).
3 = uncrowded (reliable).
4 = very uncrowded (very reliable).

Source: May 1975 Areawide Travel Survey.

The satisfaction ratings of Table 28 show very little difference in average ratings among the four modes, with BART riders being, if anything, slightly more satisfied with cost, safety, and security, and slightly less satisfied with station parking space availability.

The perception ratings of Table 29 suggest that BART riders perceive BART to be more crowded in rush hours than do nonusers, but also perceive BART as more reliable. However, the small sample sizes involved permit little confidence in these results.

Reasons for Reduced Use of BART

According to the May 1975 survey, 62% of the travelers making weekday trips in the BART service area have tried BART at least once since it opened. However, only 17% of travelers who have tried BART continue to use it for three or more trips per week.

The following BART-service related factors were mentioned by respondents to the survey as the reasons why BART is not used as often as before: "BART stations are too far from home" (mentioned by 16% of the respondents); "BART costs too much" (6%); "BART is unreliable" (4%); "BART trip takes too long" (3%); "BART is inconvenient" (3%); "BART is unsafe" (2%); "BART is too crowded" (1%); "BART stations don't have enough parking spaces" (1%). Again, small sample sizes do not allow much confidence to be placed in these results, but they suggest that access-related problems are the principal cause of reduced BART use.

Comparison of Attitudes Towards BART: 1971, 1973, and 1975

This section compares attitudes towards BART as revealed in the May 1975 survey with those given in a report on the results of the 1971 and 1973 Attitude and Awareness Surveys (described in Chapter II).

The October 1971 Attitude and Awareness Survey, the May 1973 Attitude and Awareness Survey, and the May 1975 Areawide Travel Survey were conducted during periods corresponding to pre-BART service, initial (Fremont and Richmond Line) service, and full weekday service levels respectively. Table 30 compares respondents' attitudes toward BART for the three periods by showing the distribution of positive, neutral, and negative attitudes.

According to the table, the percentage of people viewing BART positively has increased from 41% to 56% over the four years and the percentage of those with neutral or negative attitudes has decreased correspondingly. Slightly different methods of computing the attitude percentages for the surveys make the comparison tenuous, but the results suggest that the reality of BART is viewed favorably relative to people's preconceptions.

Table 30

COMPARISON OF ATTITUDES TOWARD BART

Attitude	1971 October[a]	1975 May[a]	1975 May[b]
Positive	41%	46%	56%
Neutral	38	36	31
Negative	21	18	13
	100%	100%	100%
Unweighted Sample Size:	873	864	787
Percent of Unweighted Sample Responding:	97%	96%	79%

a. Source: "Attitude and Awareness Study, A comparative Analysis of Phases I and II", BART Office of Research, October 1973. Attitudes toward BART are estimated by classifying responses to an open-ended question about BART into three categories: positive, neutral, and negative.

b. Source: May 1975 Areawide Travel Survey (weighted). Attitudes toward BART were approximated using the satisfaction ratings for total trip cost, station parking, safety from accidents, and security from crime.

APPENDIX A: DEVELOPMENT OF WEIGHTING FACTORS FOR ANALYSIS OF 1976 BART PASSENGER PROFILE SURVEY

The weighting factors described here are designed to compensate for sampling and nonresponse errors introduced by:

- Variations in the proportion of travelers who were handed questionnaires at different stations and at different times of the day (differential sampling rates).
- Variations in the questionnaires returned as a function of travelers' ethnic backgrounds and time periods of travel (differential response rates).

The weighting scheme comprises two sets of weighting factors, the first to compensate for the variation in sampling rates, and the second for variation in response rates. Thus, before analysis of the data, each respondent was weighted by the product of two factors: a sampling rate factor and an ethnic response rate factor.

Sampling Rate Factors

The Metropolitan Transportation Commission (MTC) developed the factors used to compensate for the variation in sampling rates. These are documented elsewhere.* Factors were calculated for each station by dividing the number of people who entered the station by the number of people who received questionnaires for each of the following time periods:

Daytime Period	Time of Questionnaire Handout
1	6:00 a.m. to 7:29 a.m.
2	7:30 a.m. to 8:14 a.m.
3	8:15 a.m. to 8:59 a.m.
4	9:00 a.m. to 11:59 a.m.
5	12:00 p.m. to 3:00 p.m.

*1976 BART Passenger Profile Survey: Field Methods and Processing Procedures," MTC, September 1976.

Ethnic Response Rate Factors

The Transportation System and Travel Behavior (TSTB) Project team developed weighting factors to compensate for variations in response rates for six ethnic categories (Asian, Black, Spanish-American, White, Other, and "no identification given") and two time periods (morning peak, 6:00 a.m. to 8:59 a.m., and off-peak, 9:00 a.m. to 3:00 p.m.). Variations in response rates by ethnic category within these two periods are not large enough to warrant a finer breakdown by time period.

The following paragraphs describe the steps taken by the TSTB Project team to calculate the ethnic response rate compensation weighting factors for each of the two time periods. Table A-1 documents the steps described below for the morning peak period.

Step 1: Estimate Questionnaires Handed Out to Each Ethnic Category. This step attempts to determine the total number of questionnaires handed out to each ethnic group (for all 33 stations combined). On their tally sheets, interviewers recorded the "visual" ethnic identity of each questionnaire recipient, but in a number of cases, the ethnic identity recorded differed from that given by the recipient/respondent in the returned questionnaire. Using the following procedure, the team adjusted the tally sheet totals to reflect these differences.

The team compared the tally sheet record of ethnic category with the respondent's response to the ethnic self-identification question. Then the information was aggregated for the returned questionnaires to determine the percentage of time the survey interviewers were incorrect in recording the respondent's ethnic category and to which category the respondent was incorrectly assigned. For example: 2.136% of the respondents recorded by interviewers as Asian, Black, Spanish-American or Other are actually White according to returned questionnaires. Of the 2.136%, 0.379% were incorrectly reported as Asian, 0.396% as Black, 0.982% as Spanish-American, and 0.379% as Other. Since the tally sheets indicate that 4,050 questionnaires were distributed to Whites during the morning peak period, the procedure required adding 86 (=4,050 x 2.136%) to the total for Whites and subtracting: 15 (=4,050 x 0.379%) from the tally total for Asians; 16 (=4,050 x 0.396%) from the tally total for Blacks; 40 (=4,050 x 0.982%) from the tally total for Spanish-Americans; and 15 (=4,050 x 0.379%) from the tally total for Others.

The team performed this procedure for the five ethnic categories. The net result for the morning peak period is the second line under Step 1 in Table A-1.

Step 2: Estimate Questionnaires Returned by Ethnic Category. The team recorded the number of questionnaires returned according to the ethnic category listed on the questionnaire. Respondents who did not designate their ethnic category were allocated according to the same ethnic distribution as those who did respond.

Table A-1

CALCULATION OF RESPONSE RATE WEIGHTS
[Time Period: Morning Peak (6:00 a.m. to 8:59 a.m.)]

Step 1: Estimate Questionnaires Handed Out

	Asian	Black	Spanish-American	White	Other	Total
As Recorded on Tally Sheets	391	689	251	4,050	81	5,462
Adjustment	+ 77	- 2	+ 56	- 137	+ 6	+ 0
Adjusted Total	468	687	307	3,913	87	5,462
Percent	8.6%	12.6%	5.6%	71.7%	1.5%	100.0%

Step 2: Estimate Questionnaires Returned

	Asian	Black	Spanish-American	White	Other	Total
As Recorded on Questionnaires	330	385	200	3,062	51	4,028
Allocation of Nonresponses	+ 23	+ 34	+ 15	+ 194	+ 4	+ 270
Adjusted Total	353	419	215	3,256	55	4,298
Percent	8.2%	9.7%	5.0%	75.8%	1.3%	100.0%

Step 3: Derive Weights

Asian	Black	Spanish-American	White	Other
468 ÷ 353 = 1.326	687 ÷ 419 = 1.640	307 ÷ 215 = 1.428	3,913 ÷ 3,256 = 1.202	5,462 ÷ 4,298 = 1.582

Step 4: Derive Weight for Nonrespondents

$$(0.086)(1.326) + 0.126(1.640) + (0.056)(215) +$$

$$(0.717)(1.202) + (0.015)(1.528) = 1.286$$

Step 3: Calculate Weights by Ethnic Category. The team calculated the weights by dividing the adjusted totals from step 1 by the adjusted totals from step 2 for each ethnic group.

Step 4: Calculate Weight for Nonrespondents. Respondents who did not list an ethnic category on their questionnaires were assigned a weighting factor calculated as the weighted average of the five ethnic category weights.

Table A-2 gives the ethnic response rate weighting factors for peak and off-peak periods.

Table A-2

SUMMARY OF ETHNIC RESPONSE RATE WEIGHTS

Respondent's Ethnic Identification	Time of Questionnaire Handout: Morning Peak Period (6:00 a.m. to 8:59 a.m.)	Time of Questionnaire Handout: Off-Peak Period (9:00 a.m. to 3:00 p.m.)
Asian	1.326	1.433
Black	1.640	1.814
Spanish-American	1.428	1.414
White	1.202	1.371
Other	1.582	2.271
No identification given	1.286	1.453

APPENDIX B: PEAK AND OFF-PEAK WEIGHTING FACTORS FOR 1976 BART PASSENGER PROFILE ANALYSIS

Data from BART's Data Acquisition System (DAS) for October 21, 1976, show the following distribution of ridership on the System by time period:

Time of Entry	Number of BART Trips			
	East Bay	West Bay	Transbay	Total
6:00 a.m. to 9:00 a.m.	11,579	10,502	15,038	37,119
9:00 a.m. to 3:00 p.m.	11,330	8,422	12,587	32,339
3:00 p.m. to 7:00 p.m.	16,264	14,383	20,671	51,318
7:00 p.m. to midnight	3,269	2,005	4,804	10,078
Total	42,442	35,312	53,100	130,854

The following ratios can be computed:

$$\frac{\text{Morning peak-period ridership (6:00 a.m. to 9:00 a.m.)}}{\text{Total peak-period ridership (6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m.)}}$$

$$\frac{\text{Midday off-peak ridership (9:00 a.m. to 3:00 p.m.)}}{\text{Total off-peak ridership (9:00 a.m. to 3:00 p.m. and 7:00 p.m. to midnight)}}$$

These ratios are:

	East Bay	West Bay	Transbay	Total
Morning Peak / Total Peak	2.4046	2.3695	2.3746	2.3825
Midday Off-peak / Total Off-peak	1.2885	1.2381	1.3817	1.3116

These ratios are used as weighting factors to estimate the characteristics of all-day BART ridership from tabulating of 1976 BART Passenger Profile Survey data for the morning peak (6:00 a.m. - 9:00 a.m.) and midday off-peak (9:00 a.m. to 3:00 p.m.) periods.

APPENDIX C: ESTIMATION OF 1975 INCOME DISTRIBUTION

Income distributions for the BART service area counties for 1975 (given in Table 2, Chapter III) were estimated from the 1969 BART service area distributions given in the U.S. Census by using a set of transition factors. For the U.S. as a whole, 1969 and 1975 family incomes were distributed as follows:

Annual Family Income for Total U.S.

	Income Range	1969	1975
1.	Under $5,000	20.0%	12.1%
2.	$5,000 to $6,999	12.3	8.2
3.	$7,000 to $9,999	21.7	12.8
4.	$10,000 to $14,999	26.7	22.4
5.	$15,000 to $24,999	15.6	30.4
6.	$25,000 and over	3.7	14.1
		100.0%	100.0%

Source: Bureau of Census, Table 4 of "Money, Income, and Poverty Status of Families and Persons in the United States: 1975 and 1974 Revisions (Advance Report)," Consumer Income, Current Population Reports, Series P-60, No. 103, September 1976.

These two income distributions can be related as follows:

1975 Income Range 1 = 0.605 (1969 Income Range 1)

1975 Income Range 2 = 0.395 (1969 Income Range 1) + 0.024 (1969 Income Range 2)

1975 Income Range 3 = 0.976 (1969 Income Range 2) + 0.037 (1969 Income Range 3)

1975 Income Range 4 = 0.963 (1969 Income Range 3) + 0.056 (1969 Income Range 4)

1975 Income Range 5 = 0.944 (1969 Income Range 4) + 0.333 (1969 Income Range 5)

1975 Income Range 6 = 0.667 (1976 Income Range 5) + 1.000 (1969 Income Range 6)

The same set of transition factors were applied to the 1969 income distributions for each of the Bay Area counties to give the 1975 income distributions shown in Table 2.

APPENDIX D: APPLICATION OF TWO-WAY CONTINGENCY TESTS

Table D-1 shows the calculated estimates of confidence bounds for use in two-way contingency tests of percentages given in many of the tables of this report. The estimates were developed using a likelihood ratio test of independence of the sample percentages with respect to the stratification being analyzed. The test statistic used to estimate the confidence interval is distributed approximately as chi-square, which is an asymmetric distribution. The confidence interval is consequently not exactly symmetric about the estimated percentage. However, in constructing the table, symmetry is assumed, and the "confidence bound" is calculated as half the interval between the confidence limits. The slight error thereby introduced is largest for the 5% or 95% estimates and smallest for the 50% estimates.

Example of a Two-Way Contingency Test

According to Table 4 (Chapter IV), 71.7% of the people riding BART during the morning peak are white and 28.3% are nonwhite. During the off-peak period, 73.5% of the people are white, and 26.5% are nonwhite. A two-way contingency test can be used to determine if significantly more whites are riding BART during the off-peak period than during the peak. Since the percentage of whites is approximately 70% and since the sample sizes are approximately 4,000 for the morning peak (Sample 1) and 4,000 for the off-peak (Sample 2), the confidence bound 2.1, from Table D-1, is used in the contingency test. The estimated percentage from Sample 2 (P_2 = 73.5%) is within plus or minus 2.1% of the estimated percentage from Sample 1 (P_1 = 71.7%); therefore, statistically, the difference between the two observed percentages is not significant at the 95% confidence level.

Table D-1

CONFIDENCE BOUNDS FOR TWO-WAY CONTINGENCY TESTS[a]
(Percentages Shown are ± at the 95% Confidence Level)

Magnitude of Estimated Percentage	Size of Sample 1 (n_1)/Size of Sample 2 (n_2)									
	100/100	600/300	700/600	1000/1000	2000/1000	3000/1000	2000/2000	3000/3000	5000/3000	4000/4000
5% or 95%	6.1	3.0	2.4	1.9	1.6	1.4	1.3	1.1	1.0	1.0
10% or 90%	8.0	4.2	3.3	2.7	2.3	2.1	1.9	1.5	1.4	1.4
20% or 80%	10.8	5.5	4.2	3.5	2.9	2.7	2.4	2.0	1.8	1.8
30% or 70%	12.6	6.2	4.8	4.1	3.5	3.3	2.9	2.3	2.1	2.1
40% or 60%	13.3	6.7	5.2	4.3	3.7	3.5	3.1	2.5	2.2	2.2
50% or 50%	13.9	6.8	5.3	4.4	3.7	3.5	3.1	2.5	2.2	2.2

a. The confidence bounds were constructed using a likelihood ratio test of independence of the sample percentages with respect to the stratification being analyzed for a two-by-two contingency table with P_1, P_2, $(1-P_1)$, and $(1-P_2)$ as the four proportions. The null hypothesis is $P_1 = P_2$ and the alternative is $P_1 \neq P_2$.

APPENDIX E

DETERMINATION OF BART'S SERVICE AREA

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APPENDIX E

DETERMINATION OF BART'S SERVICE AREA

The Problem

To date, the BART Impact Program has commonly defined the BART service area as the area encompassed by the three tax-supporting BART District (BARTD) counties of Alameda, Contra Costa, and San Francisco simply because virtually all of the System is contained in these three counties. However, it is unreasonable to believe that the 71-mile System can adequately serve all 1,500 square miles in the three counties. Clearly, some parts of the area are better served than others; and some areas outside the three counties are effectively served by BART, notably the northwestern part of San Mateo County near the Daly City BART station. The purpose of this appendix is to suggest a more reasonable BART service area for use in subsequent analyses of the BART Impact Program.

Determining BART Service Levels

It is likely that BART best serves the areas near the stations and provides progressively less service to areas further and further from the stations. Hence, the BART service area can be characterized by a "gradient" of service levels around the stations. For the purposes of this analysis, the BART service provided to an area is measured by the number of BART riders originating from the area divided by its residential acreage. This gives a measure of the "concentration" of BART riders coming from the zone. Traffic zones in the 440-zone system are taken as the units of area. A map showing the zone system and its relationship to BART is included in the appendix.

The 1976 BART Passenger Profile Survey was used to determine the number of BART riders starting their trips from zones in the 440-zone system. Origin zip codes of BART riders traveling on the first leg of a round-trip (and beginning their trip between 6:00 a.m. and 3:00 p.m.) were tabulated from the survey data. (The distribution of these trip origins is close to the distribution of BART passengers' residence locations.) The number of BART riders originating from each zip code area was then allocated to the traffic zones covered by the zip code area. BART riders were allocated to each zone based on the proportion of the zip code's residential development occuring in that zone and on the proximity of the zone to BART.

The appendix shows the estimated number of BART riders originating from each of the 239 zones in San Francisco, Alameda, and Contra Costa Counties; and the northern portion of San Mateo County. (This 239-zone area is the area covered by the BART Impact Program May 1975 Areawide Telephone Travel Survey and is shown in the appendix figure.) Table 1 provides a summary of the numbers given in the appendix and shows the origin areas of BART riders not included in the appendix. The table shows that a large majority (85.4%) of BART riders start their trips

Table 1

ORIGINS OF BART RIDERS

County	Percent of BART Riders' Origins	Number of BART Riders
San Francisco	21.3%	13,270
Alameda	37.4	23,300
Contra Costa	26.7	16,600
Northern San Mateo[a]	10.3	6,410
Other San Mateo[b]	0.9	560
Santa Clara	1.9	1,180
Marin	0.4	250
Napa	0.1	60
Other Areas	1.0	620
Total	100.0%	62,250[c]

a. Cities of South San Francisco, San Bruno, Brisbane, Colma, Daly City, Pacifica, and Millbrae.
b. Areas of San Mateo County not included in Footnote a.
c. Average ridership during the survey period (6:00 a.m. to 3:00 p.m.) amounted to 124,500 daily trips. Assuming an average of two trips per passenger gives an estimate of 62,250 people who used BART daily during the survey period.

Source: 1976 BART Passenger Profile Survey. Tabulations for BART travelers making the first leg of a round trip.

from within 218 zones comprising the three BARTD counties. An additional 10.3% come from the 21 zones in northern San Mateo County, raising the total to 95.7%. Since less than 5% of BART riders come from elsewhere, only the 239-zone area of northern San Mateo County and the three BARTD counties is further considered in the analysis.

Alternative BART Service Areas

The 88 zones shown shaded in Figure 1 either contain a BART station, have a significant portion of their developed areas within a one-half mile radius of a BART station, or have employment areas easily accessible from BART. (This is the area in which workplaces were sampled in the BART Impact Program 1977 Workplace Survey.) Typically, 54.3% of BART's riders start their trips from this 88-zone area. As mentioned, this 54.3% estimate is close to the percentage of BART riders having their residences in the area. The area contains 32.1% of the residential acreage in the 239-zone total and 38.2% of the population.

Figures 2, 3, and 4 show three further possible BART service areas of 106, 126, and 155 zones, respectively. Zones were selected and added consecutively to the 88-zone area of Figure 1 to create the areas shown in Figures 2, 3, and 4 on the following basis: a ratio of BART riders to residential acreage was computed for each zone in the 239-zone area of northern San Mateo County and the three BARTD counties. All zones with ratios equal to or greater than 1.00 were added to Figure 1 to create Figure 2. Zones with ratios between 0.60 and 0.99 were added to Figure 2 to create Figure 3, and zones with ratios between 0.35 and 0.59 were added to Figure 3 to create Figure 4. The ranges for the ratios were picked so that the shaded area of Figure 2 would contain the residences of about 65% of all BART riders, Figure 3 about 75%, and Figure 4 about 85%.

Table 2 summarizes, for each of the shaded areas shown in Figures 1 through 4, the percentage of BART riders having their trip origins (place of residence) in the area, the percentage of total (239-zone) residential acreage in the area, and the percentage of total (239-zone) population in the area. The second row in the table shows that among the cases listed, the largest ratio of BART riders to residential area (1.77) occurs when about two-thirds (65.1%) of all BART riders are accounted for. The third, fourth, and fifth rows show the ratio, i.e., the "concentration" of BART riders, decreases with increases in area.

Conclusions

Clearly, no one BART service area can be defined unequivocally. Depending on the selection criterion, any one of the areas shown in Figures 1, 2, 3, or 4 (covering roughly 55%, 65%, 75%, and 85% of BART riders' origins, respectively) define reasonable areas, as of course do many

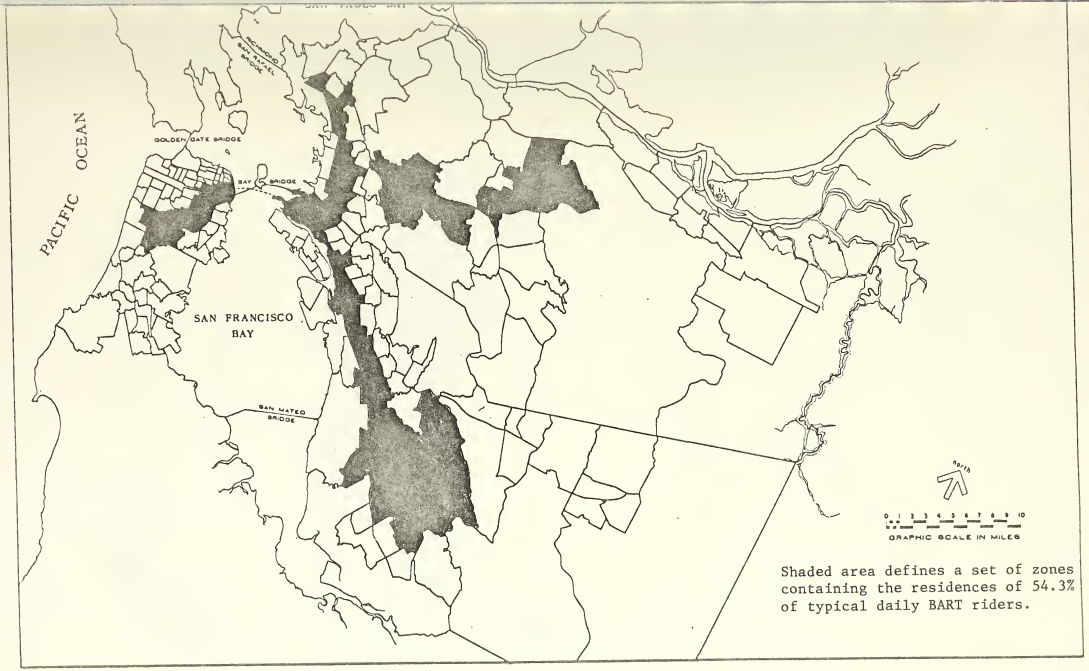


Figure 1

88-ZONE AREA (1977 WORKPLACE SURVEY SAMPLING AREA)

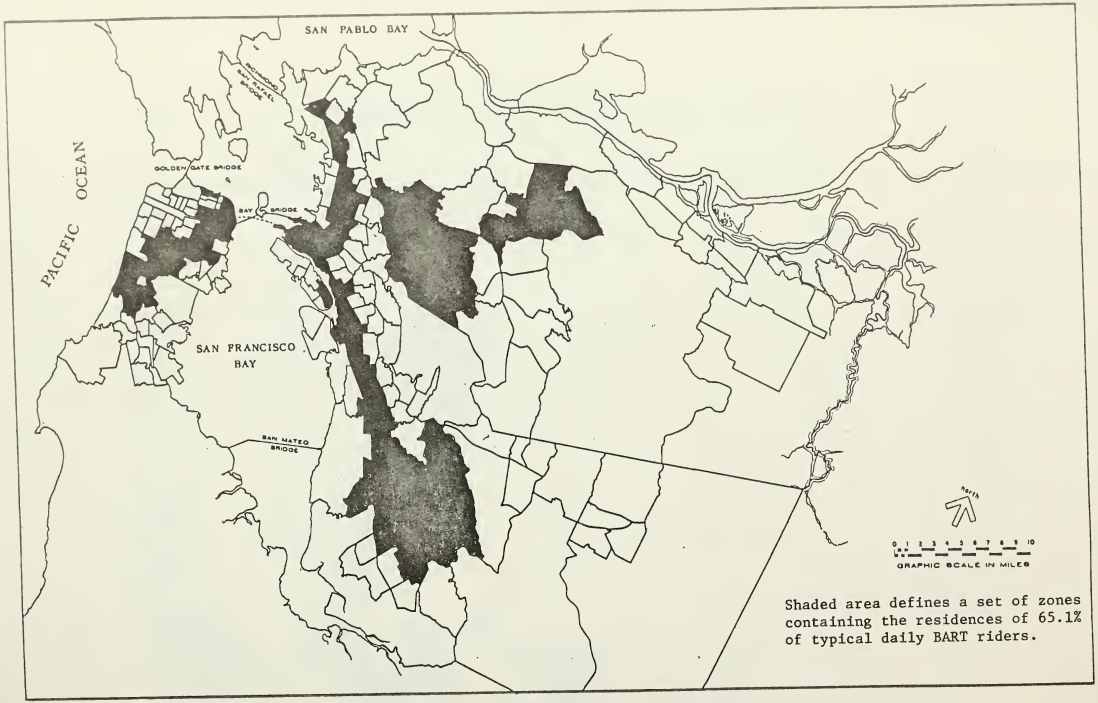
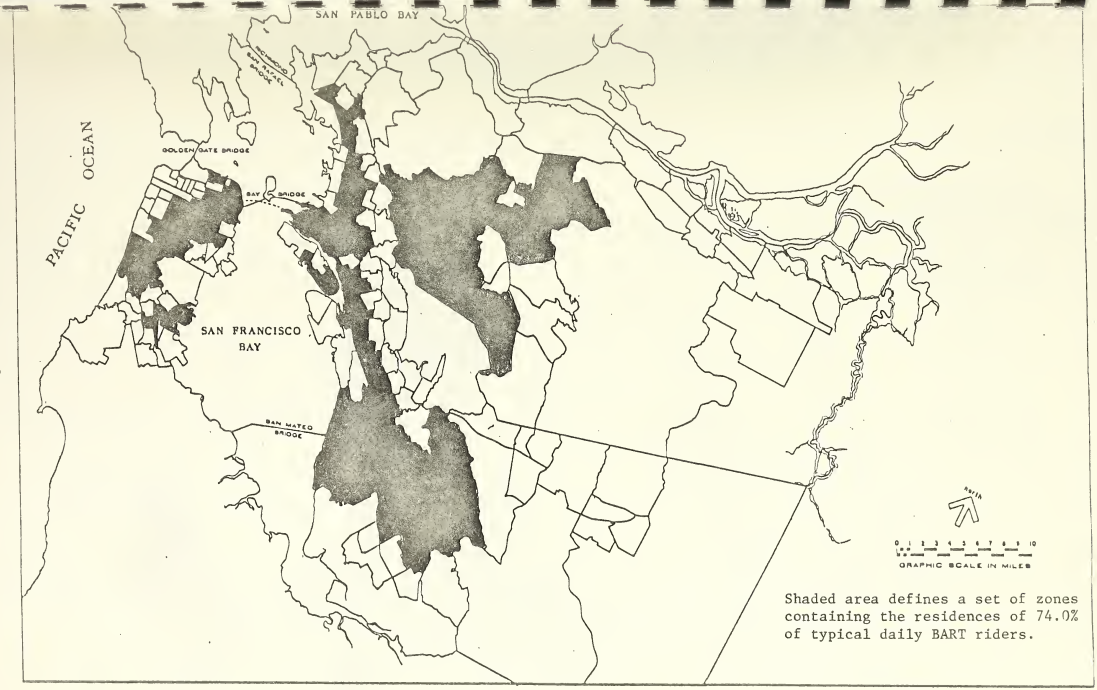


Figure 2

106-ZONE AREA



Shaded area defines a set of zones containing the residences of 74.0% of typical daily BART riders.

Figure 3

126-ZONE AREA

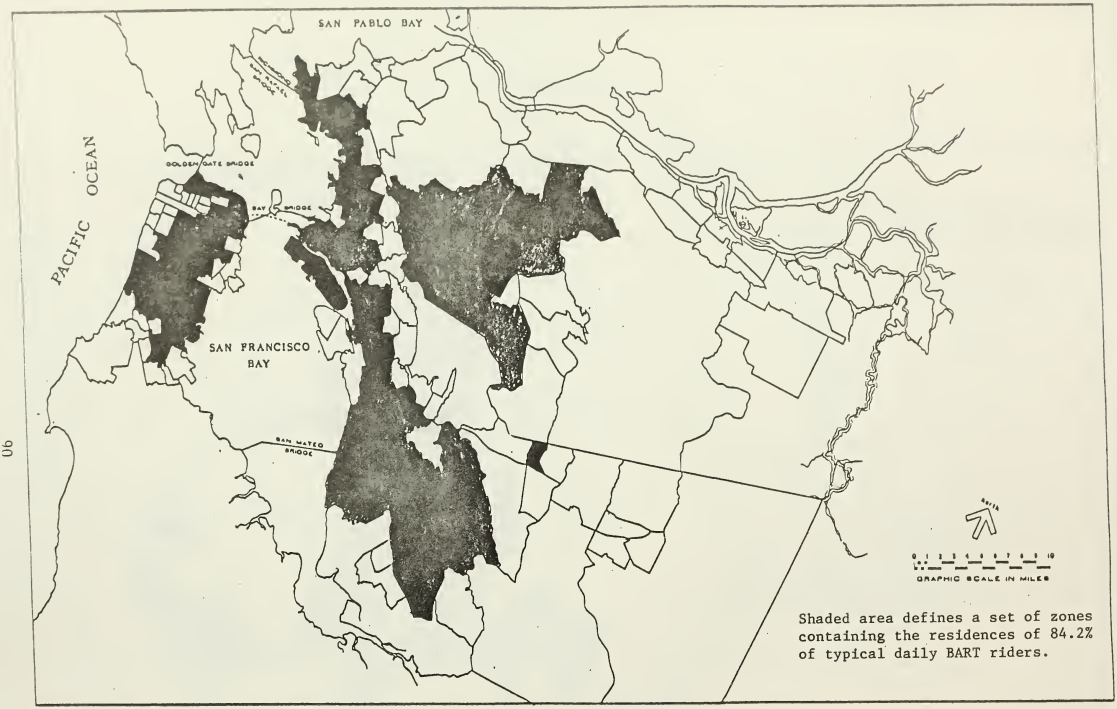


Figure 4

155-ZONE AREA

Table 2

ALTERNATIVE BART SERVICE AREAS

Area Represented	Percent of BART Riders' Origins[a]	Percent of Residential Acreage[b]	Percent of Population[c]	Ratio of BART Riders to Residential Acreage
Figure 1 (88 zones) (Workplace Survey Area)	54.3%	32.1%	38.2%	1.69
Figure 2 (106 zones)	65.1	36.8	44.8	1.77
Figure 3 (126 zones)	74.0	44.9	54.0	1.65
Figure 4 (155 zones)	84.2	59.2	68.0	1.42
Alameda, Contra Costa, and San Francisco Counties (3 BARTD Counties) (218 zones)	85.4	92.2	91.1	0.93
Alameda, Contra Costa, San Francisco, and northern San Mateo Counties (Telephone Survey Area) (239 zones)	95.7	100.0	100.0	0.96

a. Percentages are based on an estimated total of 62,250 people who made BART trips during the 1976 BART Passenger Profile Survey period.
b. Percentages are based on a total 1975 Estimate of 91,426 residential acres. Source: ABAG Provisional Series 3 Projections.
c. Percentages are based on a total 1975 population of 2,574,000. Source: ABAG Provisional Series 3 Projections.

others. (Data given in the appendix allow the BART ridership, residential acreage, and population covered by any given set of zones to be computed.)

The area shaded in Figure 2 is perhaps close to the most reasonable choice for the BART service area. It represents the zones from which almost two-thirds of all BART travelers start their trips, covers about one-third of all the residential land in the "greater" (239-zone) BART service area, and is a set of zones for which there is a high ratio of BART riders to residential area. On the other hand, the 65.1% of BART riders accounted for may be felt to be a rather low figure in total.

In selecting a recommended BART service area for use in subsequent analyses, the area shown shaded in Figure 2 (which was derived strictly according to the ratio of estimated BART riders to residential acreage criterion) was modified by deleting 2 zones and adding 25 zones. One zone (#440) was deleted because it was not contiguous with the remainder of the area, and one (#370) was deleted because it contributes a very small BART ridership. The 25 zones were added because large numbers of BART riders (over 200) originated from each (in spite of their having a low riders-to-area ratio) and because they contributed to the general geographic uniformity of the area by filling in the "gaps" in Figure 2.

Figure 5 shows the resulting recommended 129-zone BART service area, and Table 3 shows the BART riders, acreage, and total population accounted for. According to the table, 78.1% of all BART riders come from the recommended 129-zone area shown shaded in Figure 5. The 129-zone area contains 54.1% of the residential acreage and 59.5% of the population of the 239-zone "greater" BART service area.

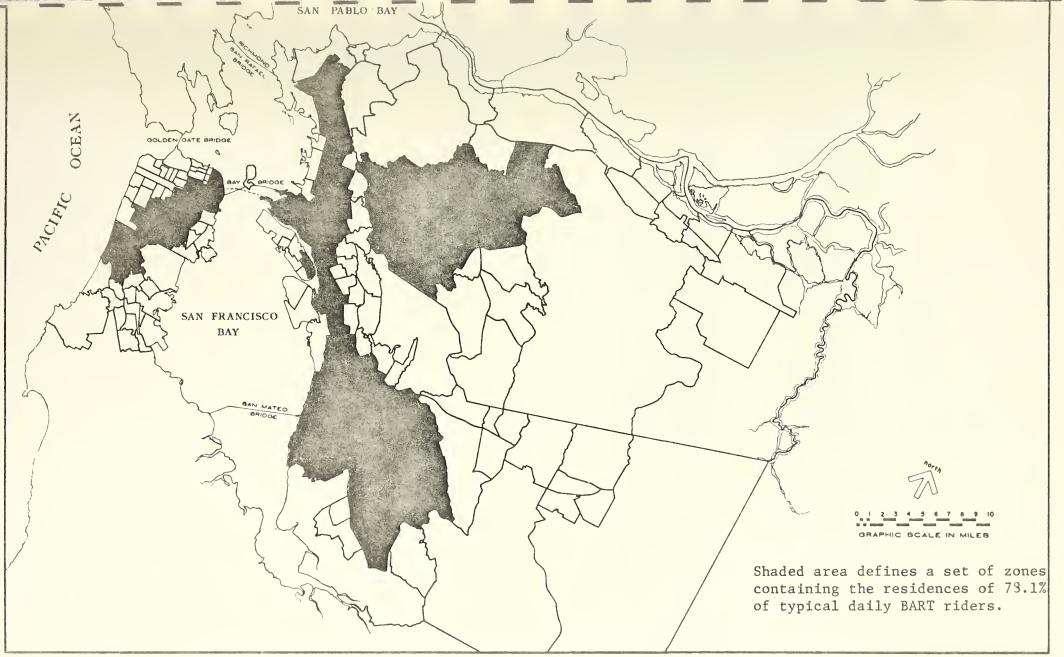


Figure 5

RECOMMENDED 129-ZONE BART SERVICE AREA

Table 3

RECOMMENDED BART SERVICE AREA

Area Represented	Percent of BART Riders' Origins[a]	Percent of Residential Acreage[b]	Percent of Population[c]	Ratio of BART Riders to Residential Acreage
Figure 5 (129 zones)	78.1%	54.1%	59.5%	1.44

a. Percentages are based on an estimated total of 62,250 people who made BART trips during the 1976 BART Passenger Profile Survey period.
b. Percentages are based on a total 1975 estimate of residential acres. Source: ABAG Provisional Series 3 Projections.
c. Percentages are based on a total 1975 population of 2,574,028. Source: Provisional Series 3 Projections.

Appendix

1. Zones are defined by the MTC 440 traffic zone system.

2. The numbers of BART riders are estimated from the tabulations of the 1976 Passenger Profile Survey for passengers making the first leg of a round trip between 6:00 a.m. and 3:00 p.m. The distribution of these BART riders' origins is close to the distribution of their residences. The total of all BART riders shown is 62,250, an estimate of total daily BART riders.

3. Residential acreage and population estimates are from ABAG, Provisional Series 3 Projections (Association of Bay Area Governments, March, 1977.)

CONTRA COSTA COUNTY

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
73	62	636	0.097	10,399					
74	124	401	0.309	9,571					
75	124	645	0.192	13,825					
76	87	202	0.431	5,329				x	
77	100	873	0.115	16,941					
78	37	386	0.096	7,787					
79	25	245	0.102	3,540					
80	62	178	0.348	5,007					
81	62	439	0.141	3,411					
82	0	418	0.000	6,810					
83	259	1,024	0.253	12,376					
84	163	783	0.208	17,005					
85	352	576	0.611	9,206			x	x	
86	100	334	0.299	2,744					
87	209	674	0.310	7,928					
88	75	411	0.182	4,481					
89	1,200	1,154	1.040	15,472		x	x	x	x
90	157	380	0.413	5,162	x	x	x	x	x
91	664	730	0.910	7,183	x	x	x	x	x
92	507	744	0.681	7,346	x	x	x	x	x
93	783	898	0.872	10,900	x	x	x	x	x
94	560	1,048	0.534	15,241				x	x
95	484	715	0.677	8,270			x	x	x
96	507	669	0.758	11,165	x	x	x	x	x
97	317	638	0.497	9,145				x	x
98	507	137	3.701	6,195	x	x	x	x	x
99	838	1,154	0.726	21,890			x	x	x
100	670	816	0.821	17,334	x	x	x	x	x
101	371	665	0.558	12,554	x	x	x	x	x
102	380	784	0.485	14,067	x	x	x	x	x

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
103	997	1,725	0.578	33,726	x	x	x	x	x
104	939	1,097	0.856	28,094	x	x	x	x	x
105	723	585	1.236	10,231	x	x	x	x	x
106	184	1,068	0.172	19,899					
107	0	165	0.000	1,983					
108	78	256	0.305	7,396					
109	223	736	0.303	15,162					
110	316	1,018	0.310	19,107					
111	109	533	0.205	10,091					
112	0	200	0.000	4,384					
113	337	1,076	0.313	28,081					x
114	187	1,288	0.145	16,874					
115	223	567	0.393	13,720				x	x
116	307	366	0.839	12,692	x	x	x	x	x
117	173	363	0.477	10,344				x	
118	334	506	0.660	13,593	x	x	x	x	x
119	626	499	1.255	10,393	x	x	x	x	x
120	434	167	2.599	4,673	x	x	x	x	x
121	434	390	1.113	10,526	x	x	x	x	x
122	192	813	0.236	13,589					x
Total Contra Costa County	16,602	32,175	0.516	582,842					

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
123	150	430	0.349	7,480					
124	192	396	0.485	7,656				x	x
125	505	508	0.994	14,052	x	x	x	x	x
126	44	119	0.370	4,723				x	
127	62	168	0.369	7,652				x	
128	458	388	1.180	12,572	x	x	x	x	x
129	497	153	3.248	12,402	x	x	x	x	x
130	145	55	2.636	4,048	x	x	x	x	x
131	40	119	0.336	1,578					
132	169	313	0.540	9,924				x	x
133	868	342	2.538	20,528	x	x	x	x	x
134	543	445	1.220	16,365	x	x	x	x	x
135	12	75	0.160	4,107					
136	206	412	0.500	16,170	x	x	x	x	x
137	642	482	1.332	16,496	x	x	x	x	x
138	275	298	0.923	11,816	x	x	x	x	x
139	225	195	1.154	10,937	x	x	x	x	x
140	289	150	1.927	9,288	x	x	x	x	x
141	73	95	0.768	5,668	x	x	x	x	x
142	100	18	5.556	1,751	x	x	x	x	x
143	250	22	11.364	3,991	x	x	x	x	x
144	958	46	20.826	7,500	x	x	x	x	x
145	646	430	1.502	22,378	x	x	x	x	x
146	337	425	0.793	20,594			x	x	x
147	439	590	0.744	14,800			x	x	x
148	501	650	0.771	10,439			x	x	x
149	112	427	0.262	6,262					x

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
150	40	1,012	0.040	9,952					
151	40	589	0.068	5,294					
152	19	779	0.024	6,096					
153	162	517	0.313	6,702					
154	174	548	0.318	15,222					
155	307	583	0.527	18,617				x	
156	285	468	0.609	15,081			x	x	
157	259	502	0.516	12,796				x	
158	192	664	0.289	16,387					
159	300	509	0.589	19,694	x	x	x	x	x
160	138	429	0.322	15,776					x
161	413	112	3.688	5,472	x	x	x	x	x
162	62	171	0.363	9,357				x	
163	130	172	0.756	8,862			x	x	
164	192	368	0.522	15,381				x	
165	192	269	0.714	11,028			x	x	
166	508	469	1.083	17,848		x	x	x	x
167	192	200	0.960	6,563			x	x	
168	0	180	0.000	3,163					
169	0	0	--	0					
170	50	340	0.147	6,984					
171	87	128	0.680	3,845	x	x	x	x	x
172	232	219	1.059	9,992	x	x	x	x	x
173	166	425	0.391	15,728	x	x	x	x	x
174	409	843	0.485	20,695				x	
175	639	740	0.864	21,275	x	x	x	x	x
176	363	427	0.850	11,012	x	x	x	x	x
177	539	1,089	0.495	29,769				x	x
178	420	969	0.433	22,688	x	x	x	x	x
179	426	595	0.716	15,768	x	x	x	x	x

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
180	0	285	0.000	4,731					
181	211	523	0.403	9,438				x	x
182	103	586	0.176	9,040					
183	103	556	0.185	10,492					
184	279	541	0.516	12,233				x	x
185	401	173	2.318	5,927	x	x	x	x	x
186	0	152	0.000	2,164					
187	94	370	0.254	8,329	x	x	x	x	x
188	198	925	0.214	15,328					x
189	370	822	0.450	26,672	x	x	x	x	x
190	564	647	0.872	14,190			x	x	x
191	238	545	0.437	18,208	x	x	x	x	x
192	476	572	0.832	13,776	x	x	x	x	x
193	238	327	0.728	9,230	x	x	x	x	x
194	1,127	1,756	0.642	28,945	x	x	x	x	x
195	200	852	0.235	15,438	x	x	x	x	x
196	508	1,090	0.466	29,052				x	x
197	150	213	0.704	4,269	x	x	x	x	x
198	200	403	0.496	7,511	x	x	x	x	x
199	154	874	0.176	16,429					
200	0	414	0.000	6,832					
201	171	770	0.222	17,998					
202	140	576	0.243	11,322					
203	513	998	0.514	30,535				x	x
204	300	183	1.639	6,913	x	x	x	x	x
205	112	448	0.250	9,472					
206	121	207	0.585	4,764				x	
207	0	0	--	1,334					
208	168	704	0.239	13,887					
209	22	480	0.046	7,259					

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
210	0	139	0.000	1,833					
211	62	557	0.111	9,808					
212	135	1,032	0.131	18,509					
213	116	758	0.153	14,494					
214	94	655	0.144	10,409					
215	19	269	0.071	3,596					
216	41	170	0.241	1,340					
Total Alameda County	23,302	42,639	0.546	1,089,931					

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
345	88	664	0.133	13,259					
346	187	840	0.223	21,908					
347	1,023	514	1.990	16,337		x	x	x	x
348	135	444	0.304	12,776					
349	131	279	0.470	6,983				x	
350	135	179	0.754	6,623			x	x	
351	62	264	0.235	6,901					
352	187	317	0.590	9,250				x	
353	62	121	0.512	3,817				x	
354	38	117	0.325	4,570					
356	0	0	--	75					
357	81	105	0.771	3,344			x	x	
358	212	385	0.551	15,320				x	
359	212	450	0.471	14,411				x	
360	62	258	0.240	4,494					
361	722	399	1.810	9,982		x	x	x	x
362	776	233	3.330	12,403		x	x	x	x
363	1,296	765	1.694	31,132		x	x	x	x
364	93	113	0.823	5,262			x	x	x
365	798	290	2.752	21,459	x	x	x	x	x
366	109	293	0.372	8,301				x	
Total Northern San Mateo County (21 zones)	6,409	7,030	0.912	228,607					

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
367	76	286	0.266	17,581					
368	0	41	0.000	1,444					
369	44	224	0.196	10,295					
370	38	1	38.000	223		x	x	x	
371	44	155	0.284	8,506					
372	116	311	0.373	15,100				x	x
373	638	344	1.855	16,515	x	x	x	x	x
374	745	339	2.198	15,314	x	x	x	x	x
375	726	216	3.361	7,698	x	x	x	x	x
376	426	221	1.928	9,229	x	x	x	x	x
377	1,228	646	1.901	24,223	x	x	x	x	x
378	0	34	0.000	1,035					
379	679	312	2.176	20,750	x	x	x	x	x
380	25	146	0.171	8,871					
381	50	1	50.000	11		x	x	x	x
382	71	18	3.944	6,816	x	x	x	x	x
383	77	15	5.133	5,374	x	x	x	x	x
384	56	8	7.000	1,786	x	x	x	x	x
385	582	159	3.660	17,733	x	x	x	x	x
386	94	43	2.186	8,651	x	x	x	x	x
387	679	133	5.105	18,076	x	x	x	x	x
388	202	104	1.942	8,530	x	x	x	x	x
389	197	154	1.279	10,616	x	x	x	x	x
390	651	150	4.340	9,682	x	x	x	x	x
391	326	156	2.090	7,534	x	x	x	x	x
392	352	198	1.778	6,454	x	x	x	x	x
393	99	123	0.805	7,894			x	x	
394	279	312	0.894	15,797			x	x	x
395	259	70	3.700	9,583	x	x	x	x	x
396	258	77	3.351	9,068	x	x	x	x	x
397	185	232	0.797	21,771			x	x	x
398	189	299	0.632	15,371			x	x	

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
399	399	372	1.073	11,253		x	x	x	x
400	148	486	0.305	18,796					
401	81	258	0.314	11,773					
402	56	255	0.220	11,520					
403	79	287	0.275	13,594					
404	0	4	0.000	55					
405	50	374	0.134	21,127					
406	38	144	0.264	6,999					
407	47	161	0.292	11,491					
408	62	156	0.397	4,673				x	
409	12	137	0.088	11,173					
410	12	104	0.115	8,708					
411	16	161	0.099	9,836					
412	43	142	0.303	13,502					
413	81	57	1.421	6,426		x	x	x	x
414	178	44	4.045	7,436	x	x	x	x	x
415	62	38	1.632	3,116		x	x	x	x
416	116	38	3.053	6,010		x	x	x	x
417	25	16	1.563	5,190		x	x	x	x
418	200	15	13.333	11,630	x	x	x	x	x
419	124	41	3.024	14,809	x	x	x	x	x
420	49	10	4.900	8,219	x	x	x	x	x
421	236	1	236.000	1,093	x	x	x	x	x
422	296	1	296.000	1,444	x	x	x	x	x
423	171	4	42.750	14,028	x	x	x	x	x
424	156	4	39.000	7,828	x	x	x	x	x
425	94	1	94.000	1,310	x	x	x	x	x
426	94	1	94.000	2,502	x	x	x	x	x
427	63	1	63.000	279	x	x	x	x	x
428	31	1	31.000	281	x	x	x	x	x
429	75	0	--	2,421	x	x	x	x	x
430	75	0	--	1,353	x	x	x	x	x

Zone	Originating BART Riders	1975 Residential Acreage	Ratio Riders/ Acreage	1975 Population	Figure 1	2	3	4	5
431	38	0	--	66	x	x	x	x	x
432	81	15	5.400	2,670		x	x	x	x
433	80	46	1.739	4,752		x	x	x	x
434	80	22	3.636	9,060		x	x	x	x
435	105	68	1.544	10,089		x	x	x	x
436	25	47	0.532	4,835				x	
437	50	53	0.943	9,212			x	x	
438	57	258	0.221	24,830					
439	77	123	0.626	10,852			x	x	
440	114	108	1.056	8,866		x	x	x	
Total San Francisco County	13,267	9,582	1.384	672,648					

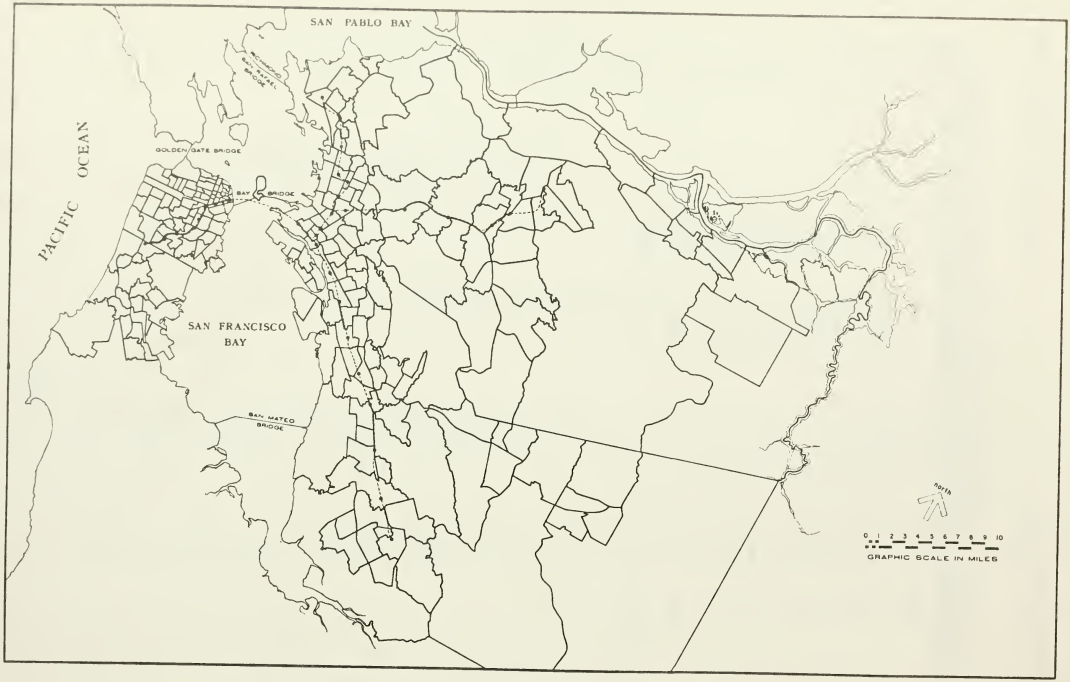


Figure 6
440 TRAFFIC ZONES SYSTEM IN
ALAMEDA, CONTRA COSTA, SAN FRANCISCO, AND NORTHERN SAN MATEO COUNTIES

239 -ZONE IN GREATER BART SERVICE AREA

APPENDIX F

DEMOGRAPHY OF AREAS SERVED BY BART

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APPENDIX F

DEMOGRAPHY OF AREAS SERVED BY BART

Definition of BART Service Areas

The purpose of this appendix is to summarize the demography of areas served by BART. The various areas for which data are given in the appendix are defined in Table 1. All zones referred to are defined by the MTC 440 regional traffic zone system.

The Greater BART Service Area is defined as the 239-zone area comprising the three BART District counties of Alameda, Contra Costa, and San Francisco (the tax-supporting BART District) plus the northern part of San Mateo County. This is the area surveyed in the BART Impact Program May 1975 Areawide Travel Survey, and for practical purposes may be regarded as the area encompassing all parts of the Bay Area potentially served by BART. As shown in Table 2, the area currently accounts for the origins of 96% of all BART riders.

The Three BARTD Counties are defined by 218 zones (the Greater BART Service Area less 21 zones in northern San Mateo County). This area has commonly been taken as an approximate BART service area largely because it defines the BART taxation District. U.S. Census and other data which are only available summarized by county may be aggregated conveniently for this three-county BART service area. The three-county area accounts for the origins of 85% of BART riders.

The Primary BART Service Area is the 132-zone area shown outlined in Figure 1, and defines a more immediate BART "catchment" area. The selection of these 132 zones was made by analyzing (1) the number of BART riders originating, (2) the total population resident, and (3) the urbanized land area in each zone of the 239-zone Greater BART Service Area. This analysis is detailed in the TSTB Project working note "Determination of BART's Service Area," September 1977.* (The 132-zone area comprises the 129-zone area shown in Figure 5 of the September 1977 working note plus zones 155, 156, and 174). The 132-zone area will be taken as the basic BART service area for use in subsequent TSTB Project analyses. The area accounts for the origins of 80% of all BART riders and 62% of the Greater BART Service Area population.

* This working note is presented as Appendix E, pp. 83-106 of this report.

Table 1

DEFINITION OF BART SERVICE CORRIDORS AND AREAS

Corridor or Service Area	Defined by Zones[a]
Home Areas	
1. Daly City Corridor (53 zones)	347, 361-365, 372-377, 379, 381-392, 394-397, 399, 413-435
2. Richmond Corridor (16 zones)	113, 115, 116, 118-122, 124, 125, 128-130, 132-134
3. Concord Corridor (17 zones)	89-105
4. Fremont Corridor (32 zones)	155, 156, 519-161, 166, 171-179, 181, 184, 185, 187-198, 203, 204
5. Oakland Corridor (14 zones)	136-149
6. Primary BART Service Area (132 zones)	Total of Corridors 1, 2, 3, 4, and 5
7. BART Express Bus Service Area (27 zones)	73-80, 82, 84-88, 106, 108-111, 114, 205, 206, 208, 211-214
8. Greater BART Service Area (3 BARTD Counties plus northern San Mateo County, 239 zones)	73-216, 345-354, 356-440
9. 3 BARTD Counties (218 zones)	Area 9 less (345-354, 356-366)
10. Richmond Field Station Area (5 zones)	112, 116-118, 121
11. Mission Field Station Area (8 zones)	379, 384-390
Workplace Areas	
12. San Francisco CBD (14 zones)	382, 383, 419-430
13. Other San Francisco Workplaces (21 zones)	365, 373-377, 379, 384-392, 395, 396, 414, 418, 431
14. Oakland CBD (3 zones)	142-144
15. Other Oakland Workplaces (7 zones)	136-141, 145
16. Richmond Line Workplaces (11 zones)	116, 118, 119-121, 125, 128-130, 133, 134
17. Concord Line Workplaces (12 zones)	90-93, 96, 98, 100-105
18. Fremont Line Workplaces (20 zones)	159, 161, 171-173, 175, 176, 178, 179, 185, 187, 189, 191-195, 197, 198, 204
19. Work Travel Survey Area	Total of Areas 12 through 18

a. Zones are as defined by the MTC 440 regional traffic zone system.

Table 2

POPULATION AND RIDERSHIP IN BART SERVICE CORRIDORS AND AREAS

BART Service Corridor or Area [a]	Number of Zones	Percent of Population[b]	Percent of BART Rider Origins	
			All Trip Purposes[c]	Work Trips[d]
Daly City Corridor	53	19.2%	26.2%	27.0%
Richmond Corridor	16	8.5	10.3	8.7
Concord Corridor	17	9.1	17.0	20.7
Fremont Corridor	32	19.4	18.2	18.4
Oakland Corridor	14	6.2	8.1	7.0
Primary BART Service Area	132	62.4	79.8	81.8
BART Express Bus Service Area	27	11.3	5.5	5.2
Work Travel Survey Area	88	38.2	54.2	54.3
Three BARTD Counties	218	91.2	85.4	83.3
Greater BART Service Area	239	100.0	95.7	96.3

a. See text for definition of corridors and areas.
b. Percentages are based on a 239-zone total 1975 population of 2,574,028.
c. Percentages are based on an estimated daily total of 62,250 people making BART trips at the time of the 1976 BART Passenger Profile Survey.
d. Percentages are based on an estimated daily total of 41,600 people making work trips by BART at the time of the 1976 Passenger Profile Survey.

Sources: ABAG Provisional Series 3 Projections, Association of Bay Area Governments, March 1977.
1976 BART Passenger Profile Survey, Tabulations for BART travelers making the first leg of a round trip.

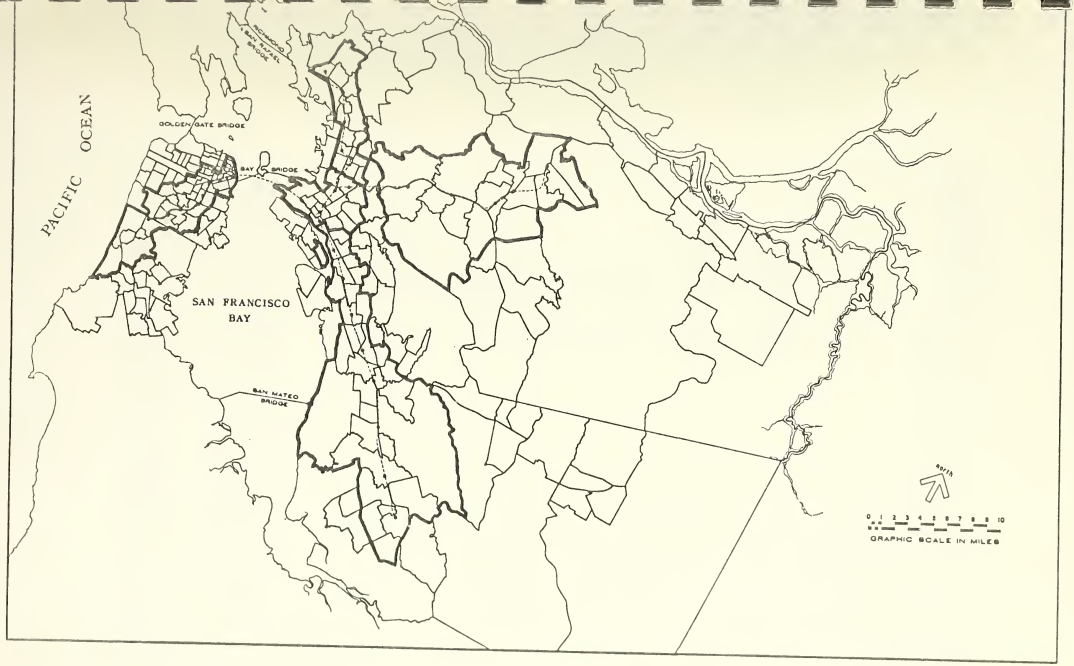

FIGURE 1

132-zone Primary BART Service Area and Corridors

The 27-zone area shown outlined in Figure 2 as the BART Express Bus Service Area accounts for the origins of relatively few BART riders (5%). Nevertheless, much of it is effectively provided with "BART Express" bus service to BART stations as follows:

BART Express Bus Line	Zones Served	
Q (El Cerrito del Norte)	110	Pinole
	111	Pinole
	114	El Sobrante
M (Concord)	106	Pacheco
	108	Martinez
	109	Martinez
P (Concord)	73	West Pittsburg
	74	Pittsburg
	75	Pittsburg
	76	Antioch
	77	Antioch
	78	Antioch
	79	Antioch
	80	Oakley
	82	Brentwood
D (Walnut Creek)	84	San Ramon
	85	Danville
	86	Alamo
	87	Danville
	88	Alamo
U (Bay Fair, Hayward)	205	Dublin
	206	San Ramon
	208	Pleasanton
	211	Pleasanton
	212	Livermore
	213	Livermore
	214	Livermore

The 132-zone BART Service Area may be considered as composed of five BART Service Corridors (Daly City, Richmond, Concord, Fremont, and Oakland) as defined in Table 1. These corridors approximate the catchment areas of the various BART lines. Boundaries between the corridors are shown in Figure 1.

For the purposes of the BART Impact Program 1977 Workplace Survey, an 88-zone sampling area was defined as in Table 1. This may be referred to as the Workplace Survey Area, and is shown outlined in Figure 3.

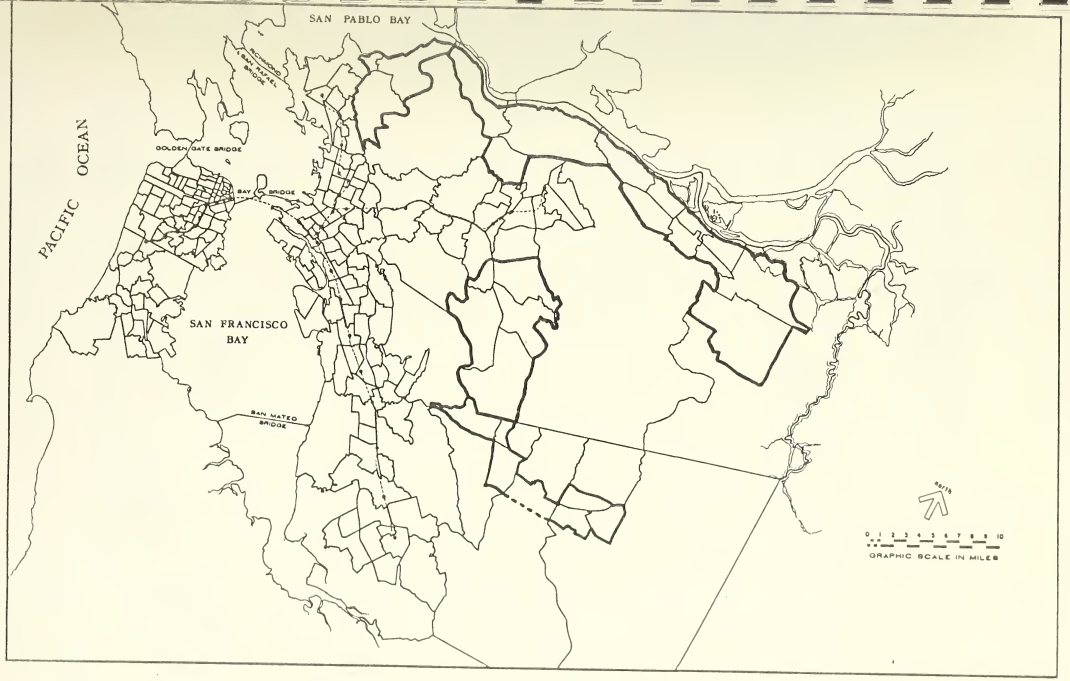

FIGURE 2

BART EXPRESS BUS SERVICE AREA

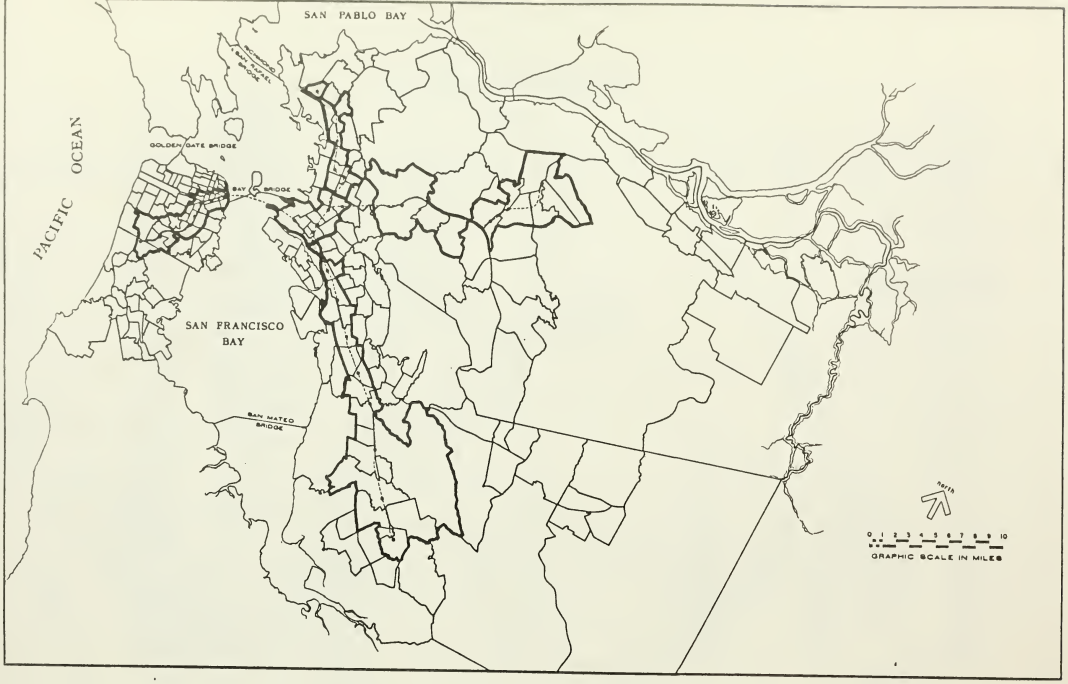

FIGURE 3

Workplace Survey Area

Data for two further sub-areas are given in this appendix. These are the areas covered by the TSTB Project's field station research of BART's impacts on minorities in Richmond and the San Francisco Mission District. The Richmond Field Station Area and Mission Field Station Area are approximated by the set of zones given in Table 1. The two areas are outlined in Figure 4.

Tables 3, 4, 5, and 6 summarize key population characteristics for the corridors and areas listed in Table 1.

Tables 3 and 4 summarize data for:

88-zone	Workplace Survey Area
132-zone	Primary BART Service Area
27-zone	BART Express Bus Service Area*
159-zone	Primary-plus-BART Express Area*
218-zone	Three BARTD Counties
239-zone	Greater BART Service Area
5-zone	Richmond Field Station Area
8-zone	Mission Field Station Area

Tables 5 and 6 summarize data for:

53-zone	Daly City-San Francisco Corridor
16-zone	Richmond Corridor
17-zone	Concord Corridor
32-zone	Fremont Corridor
14-zone	Oakland Corridor
132-zone	Total (Primary BART Serivce Area)

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*U.S. Census tract data has not been accumulated for the 27-zones comprising the BART Express Bus Service Area.

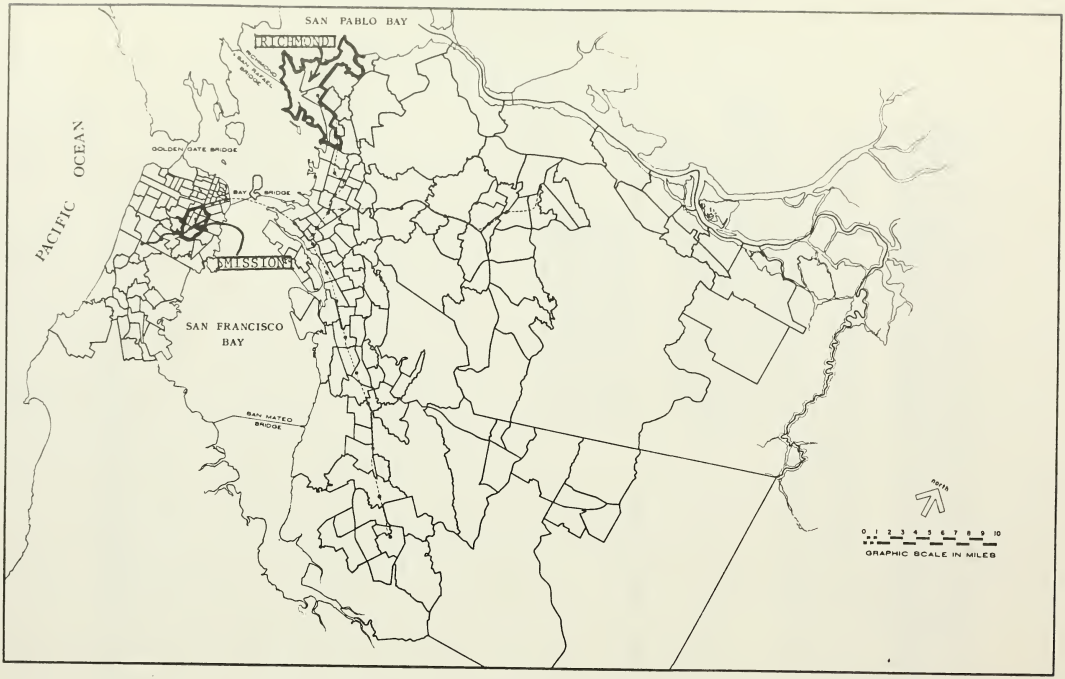

FIGURE 4

RICHMOND AND MISSION FIELD STATION AREAS

Table 3

SOCIOECONOMIC CHARACTERISTICS OF ALTERNATIVE BART SERVICE AREAS[a]

	Work Travel Survey Area	Primary BART Service Area	Three BARTD Counties	Greater BART Service Area	Richmond Field Station Area	Mission Field Station Area
Number of Zones	88	132	218	239	5	8
Population Characteristic						
Sex, 1975[b]						
Male	49.3%	49.1%	48.8%	48.9%	48.4%	48.5%
Female	50.7	50.9	51.2	51.1	51.6	51.5
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Age, 1975[b]						
Under 16	25.5%	26.3%	26.4%	26.8%	31.6%	24.5%
16 to 17	3.1	3.3	3.3	3.4	3.6	2.6
18 to 24	13.9	13.2	12.9	12.7	12.4	13.6
25 to 34	14.2	14.1	14.1	14.2	13.7	16.1
35 to 44	11.1	11.5	11.6	11.7	9.9	11.2
45 to 54	11.9	12.1	12.1	12.2	11.8	10.3
55 to 64	9.5	9.3	9.5	9.3	9.3	9.9
Over 64	10.8	10.2	10.1	9.7	7.7	11.8
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnic/Racial Category, 1975[b]						
White	60.0%	64.7%	67.4%	68.1%	35.5%	42.6%
Black	17.5	14.3	12.7	11.8	50.9	6.9
Spanish-American	15.2	13.6	12.3	12.7	8.7	37.9
Other	7.3	7.4	7.6	7.4	4.9	12.6
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Mean Family Income, 1969[c]	$11,509	$12,290	$12,752	$12,814	$9,743	$9,264
Number of Families, 1970	236,102	390,197	577,956	634,653	13,868	20,438
Percent of Families Below Poverty Level, 1970	9.7%	8.4%	8.2%	7.8%	13.9%	14.4%
Number of Workers, 1970[d]	398,066	644,969	944,634	1,041,335	18,952	35,915
Work Trip Mode, 1970[e]						
Automobile	67.9%	70.6%	72.0%	71.5%	81.4%	47.2%
Transit	18.0	16.9	17.7	16.7	10.4	41.9
Other	14.1	12.5	10.3	11.8	8.2	10.9
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

a. See text for definition of areas.
b. Percentage distributions from the 1970 Census were applied to 1975 population totals for each zone to estimate the number of people in each category in 1975. The percentages in the table are based on aggregates of the resulting 1975 estimates for each category.
c. Weighted average computed by weighting census tract averages by number of families in each census tract, 1970.
d. The number of workers in 1970 as obtained from the 1970 Census and used as the base for work trip mode percentages (footnote e).
e. Automobile: driver or passenger in private automobile; transit: bus, streetcar, or train; other: walked to work, worked at home, or other mode.

Sources: U.S. Census of Population and Housing, census tract data (1970).
ABAG Provisional Series 3 Projections of population and employed residents (1975).
BART Passenger Profile Survey. Tabulations for BART travelers making the first leg of a round trip (1976).

Table 4

POPULATION AND BART RIDERSHIP OF ALTERNATIVE BART SERVICE AREAS[a]

	Workplace Survey Area	Primary BART Service Area	BART Express Bus Service Area	Primary-plus-BART Express Service Area	Three BARTD Counties	Greater BART Service Area	Richmond Field Station Area	Mission Field Station Area
Number of zones	88	132	27	159	218	239	5	8
Population Characteristic								
Number of BART Riders, 1976 (all purposes)	33,750	49,678	3,425	53,104	53,171	59,580	1,165	2,531
Number of BART Riders, 1976 (work trips)	22,576	34,020	2,183	36,203	34,650	40,061	387	1,748
Employed Residents, 1975	431,235	708,949	107,151	816,100	1,016,539	1,213,382	16,158	35,962
1970 Total Population	1,003,014	1,620,437			2,347,247	2,565,227	54,902	89,658
1975 Total Population	995,660	1,605,666	290,445	1,896,111	2,345,421	2,574,028	48,140	80,180
All BART Riders as a Percent of Total Population	3.4%	3.1%	1.2%	2.8%	2.3%	2.3%	2.4%	3.2%
Work Trip BART Riders as a Percent of Employed Residents	5.2%	4.8%	2.0%	4.4%	3.4%	3.6%	2.4%	4.9%
Percent Change in Population 1970 to 1975	-0.7%	-0.9%			--	0.3%	-12.3%	-10.6%

a. See text for definition of areas.

Sources: U.S. Census of Population and Housing, census tract data (1970).
ABAG Provisional Series 3 Projections of population and employed residents (1975).
BART Passenger Profile Survey. Tabulations for BART travelers making the first leg of a round trip (1976).

Table 5

SOCIOECONOMIC CHARACTERISTICS OF PRIMARY BART SERVICE AREA AND COMPONENT CORRIDORS[a]

	BART Service Corridors Comprising Primary BART Service Area					
	Daly City Corridor	Richmond Corridor	Concord Corridor	Fremont Corridor	Oakland Corridor	Total All Corridors
Number of Zones	53	16	17	32	14	132
Population Characteristic						
Sex, 1975[b]						
Male	49.9%	48.5%	49.1%	48.7%	48.2%	49.1%
Female	50.1	51.5	50.9	51.3	51.8	50.9
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Age, 1975[b]						
Under 16	21.6%	23.4%	32.1%	31.5%	19.8%	26.3%
16 to 17	2.6	2.9	4.5	3.9	2.7	3.3
18 to 24	13.2	18.8	9.4	12.0	14.6	13.2
25 to 34	15.4	15.1	12.5	13.3	13.3	14.1
35 to 44	11.8	9.3	13.8	11.7	9.7	11.5
45 to 54	12.1	11.2	13.3	12.0	12.0	12.1
55 to 64	10.9	9.2	7.4	7.9	11.9	9.3
Over 64	12.4	10.1	7.0	7.7	16.0	10.2
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnic/Racial Category, 1975[b]						
White	55.2%	64.6%	92.5%	65.1%	52.0%	64.7%
Black	13.4	20.8	0.3	12.5	34.7	14.3
Spanish-American	17.5	7.8	5.7	18.3	6.0	13.6
Other	13.9	6.8	1.5	4.1	7.3	7.4
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Mean Family Income, 1969[c]	$11,677	$11,970	$15,794	$11,445	$12,107	$12,302
Number of Families, 1975[d]	106,681	47,970	61,098	127,763	36,722	380,234
Percent of Families Below Poverty Level, 1970	10.5%	8.8%	3.3%	8.1%	11.2%	8.4%
Number of Workers, 1970[e]	220,464	95,813	81,943	179,222	67,527	644,969
Work Trip Mode, 1970[f]						
Automobile	53.4%	72.5%	85.8%	85.7%	65.3%	70.6%
Transit	30.1	11.4	6.6	7.4	19.1	16.9
Other	16.5	16.1	7.6	6.9	15.6	12.5
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

a. See text for definition of areas.
b. Percentage distributions from the 1970 census were applied to 1975 population totals for each zone to estimate the number of people in each category in 1975. The percentages in the table are based on aggregates of the resulting 1975 estimates for each category.
c. Weighted average computed by weighting census tract averages by number of families in each census tract, 1970.
d. The number of families obtained from the 1970 census adjusted according to the percentage change in the total population from 1970 to 1975.
e. The number of workers in 1970 as obtained from the 1970 census and used as the base for work trip mode percentages (footnote f).
f. Automobile: driver or passenger in private automobile; transit: bus, streetcar, or train; other: walked to work, worked at home, or other mode.

Sources: U.S. Census of Population and Housing, census tract data (1970).
ABAG Provisional Series 3 Projections of population and employed residents (1975).
BART Passenger Profile Survey. Tabulations for BART travelers making the first leg of a round trip (1976).

Table 6

POPULATION AND BART RIDERSHIP OF PRIMARY BART SERVICE AREA AND COMPONENT CORRIDORS[a]

	BART Service Corridors Comprising Primary BART Service Area					
	Daly City Corridor	Richmond Corridor	Concord Corridor	Fremont Corridor	Oakland Corridor	Total All Corridors
Number of Zones	53	16	17	32	14	132
Population Characteristic						
Number of BART Riders, 1976 (all purposes)	16,284	6,437	10,604	11,301	5,053	49,679
Number of BART Riders, 1976 (work trips)	11,249	3,622	8,605	7,647	2,897	34,020
Employed Residents, 1975	234,394	101,453	97,057	206,825	69,220	708,949
Total Population, 1970	509,318	240,834	218,700	481,486	170,099	1,620,437
Total Population, 1975	494,805	219,542	233,975	499,254	158,090	1,605,666
All BART Riders as a Percent of Total Population	3.3%	2.9%	4.5%	2.3%	3.2%	3.1%
Work Trip BART Riders as a Percent of Employed Residents	4.8%	3.6%	8.9%	3.7%	4.2%	4.8%
Percent Change in Population 1970 to 1975	-2.8%	-8.8%	7.0%	3.7%	-7.1%	-0.9%

a. See text for definition of areas.

Sources: U.S. Census of Population and Housing, census tract data (1970).
ABAG Provisional Series 3 Projections of population and employed residents (1975).
BART Passenger Profile Survey. Tabulations for BART travelers making the first leg of a round trip (1976).

Comparison of Population Characteristics for 132-Zone and 239-Zone Areas

This section discusses some of the data given in Tables 3 and 4.

The percentage change in total population between 1970 and 1975 was small in both the 132-zone Primary BART Service Area and the 239-Zone Greater BART Service Area. Total population declined by 0.9% over the 5-year period in the 132-zone area, and increased by 0.3% in the 239-zone area.

The 132-zone population contains a significantly higher percentage of minorities than the 239-zone population. Black and Spanish-American residents make up 14.3% and 13.6%, respectively, of the 132-zone area population compared with 11.8% and 12.7%, respectively, in the 239-zone area. The age profiles and male/female distributions for residents of the two areas are similar.

Based on 1969 figures, mean family income shows a considerable difference between the two areas, with average income for the 132-zone area ($14,153) some 19% higher than the average for the 239-zone area ($11,910). However, the data given in Table 3 also show that a larger percentage of 132-zone families live below the poverty level than in the 239-zone area. Thus, the more immediate BART service area's population contains higher proportions of both very high income (mainly outer suburban) and very low income (mainly inner city) families compared with the 239-zone Greater BART Service Area. Employed residents form a similar proportion of the total population in both areas.

Daily BART riders form 3.1% of the total population in the 139-zone area, compared with 2.3% in the 239-zone area. However, the overall 1970 automobile/transit work mode split for the two areas is similar.

Comparison of Population Characteristics Among BART Service Corridors

This section discusses some of the data given in Tables 5 and 6.

Concord BART Service Corridor. The 17-zone area defining the BART Concord Line Service Corridor has the highest rate of population growth of the five corridors considered (7.0% increase in population between 1970 and 1975). This corridor also has by far the highest mean family income ($15,794), 12% higher than the average for the 132-zone total ($14,153). The percentage of families with incomes below the poverty level is 3.3%, considerably less than the 132-zone area average of 8.4%. The corridor's population is predominantly white, with this group accounting for 92.5% of the total.

In the Concord Service Corridor, almost 72.3% of residents are aged 44 or less, a markedly higher proportion than the 132-zone average (68.4%). The proportion of the population aged 65 or over is the lowest of the areas considered, and the proportion aged 16 or less is higher than for any of the other areas.

The 1970 statistics for mode of transportation to work shown in Table 5 reveal a strong preponderance of private automobile travel by residents of this corridor. The percentage of the population using transit in 1970 (6.6%) was the lowest of the five corridors considered. BART ridership in 1976, expressed as a percentage of the corridor population (4.5%), is the highest of the five areas considered. This is particularly noteworthy given the tradition of very low public transit usage evidenced by the 1970 statistics.

Richmond BART Service Corridor. Between 1970 and 1975, total population in this corridor declined by 8.5%, the greatest percentage decrease in population of the five corridors considered. The decline in the population of the corridor is considerably greater than the 132-zone average decline (0.9%).

The age profile of this corridor's population is close to the average for the five corridors considered. The percentage of minority residents (35.4%) is also about the same as for the 132-zone total, most of the minority population being black. Mean family income for this corridor ($11,970) is much lower than the 132-zone average ($14,153), and the percentage of families subsisting on an income below the poverty level in 1970 (8.8%) is slightly higher than the 132-zone average (8.4%). However, employed residents account for some 46.2% of the 1975 total population, a higher percentage than the 132-zone average of 44.2%.

Expressed as a percentage of corridor population, BART ridership for the Richmond Corridor (2.9%) is slightly below the five-corridor average (3.1%). Work trip mode statistics for 1970 show an 11.4% transit mode usage.

Central Oakland BART Service Corridor. The population of the Central Oakland Corridor declined by 7.1% between 1970 and 1975, much more than the average for the 132-zone area over the same period (0.9%).

The corridor contains the highest percentage of minorities (48.0%), most of these being black (34.7% of the total). Zones within the corridor vary greatly in racial distribution, with some zones containing nearly all black residents and others nearly all white residents. The Central Oakland Corridor population contains a greater percentage of residents aged 65 or over than any of the other four corridors. Correspondingly, it has the lowest percentage of young people. Although mean family income for families in the corridor ($12,107) is the second highest of the five areas considered, 11.2% of families in the corridor live in poverty, the highest percentage found in any of the five. Some 41.4% of the total population are employed, lower than the average of 44.2% for the 132-zone area.

The 1970 work mode choice data given in Table 5 show higher public transit usage in the corridor than in any of the others with 30.1% of employed residents using public transit for work journeys. The percentage of the population using BART daily in 1976 (3.2%) is about the same as the 132-zone BART service area average.

Fremont BART Service Corridor. Total population of the Fremont Service Corridor grew 3.7% between 1970 and 1975. However, this growth was not evenly distributed throughout the area. Of the 32 traffic zones comprising the area, many (mainly in the northern part of the corridor) exhibited a decline in population, while growth in some zones (in the southern part) was high.

The racial composition of this corridor is also more varied than that found in the other East Bay corridors. Spanish-Americans constitute the largest minority racial group (18.3% of the total). This is the largest percentage of Spanish-Americans in the corridors considered (though in total, more Spanish-Americans live in the Daly City Corridor).

Mean family income in 1969 ($11,445) was the lowest of the five corridors and well below the average for the 132-zone Primary BART Service Area. But only 8.1% of families live below the poverty level, far fewer than in the Oakland and San Francisco Corridors, and less than the 8.4% average for the 132-zone area. Of the area's residents, 41.4% are employed, a figure rather lower than the Primary BART Service Area average. The percentage of Fremont Corridor residents using BART (2.3% of the total area population on a typical day) is the lowest of the five corridors.

Daly City BART Service Area. The Daly City Corridor experienced a 2.5% decline in population between 1970 and 1975, higher than the average for the 132-zone area.

Racially, the Daly City area is the most diverse of the five areas considered. Some 55.2% of the population is white, but Spanish-Americans and a large proportion of "other" racial groups constitute a further 31.4% of the population. The remaining 13.4% are black. Average family income for the Daly City Corridor ($11,677) is significantly below the average for the five BART service corridors, and in 1969, 10.5% of all families in the area lived on incomes below the poverty level.

Of the total Daly City Corridor population, some 47.4% are engaged in full-time employment, higher than the average for the 132-zone BART Service Area. BART ridership from this area matches very closely the average figures for the 132-zone area, with 3.3% of the total corridor population riding the System on an average day. The 1970 work mode choice data shows by far the highest transit usage in this corridor (30.1%).